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Topic Break Down

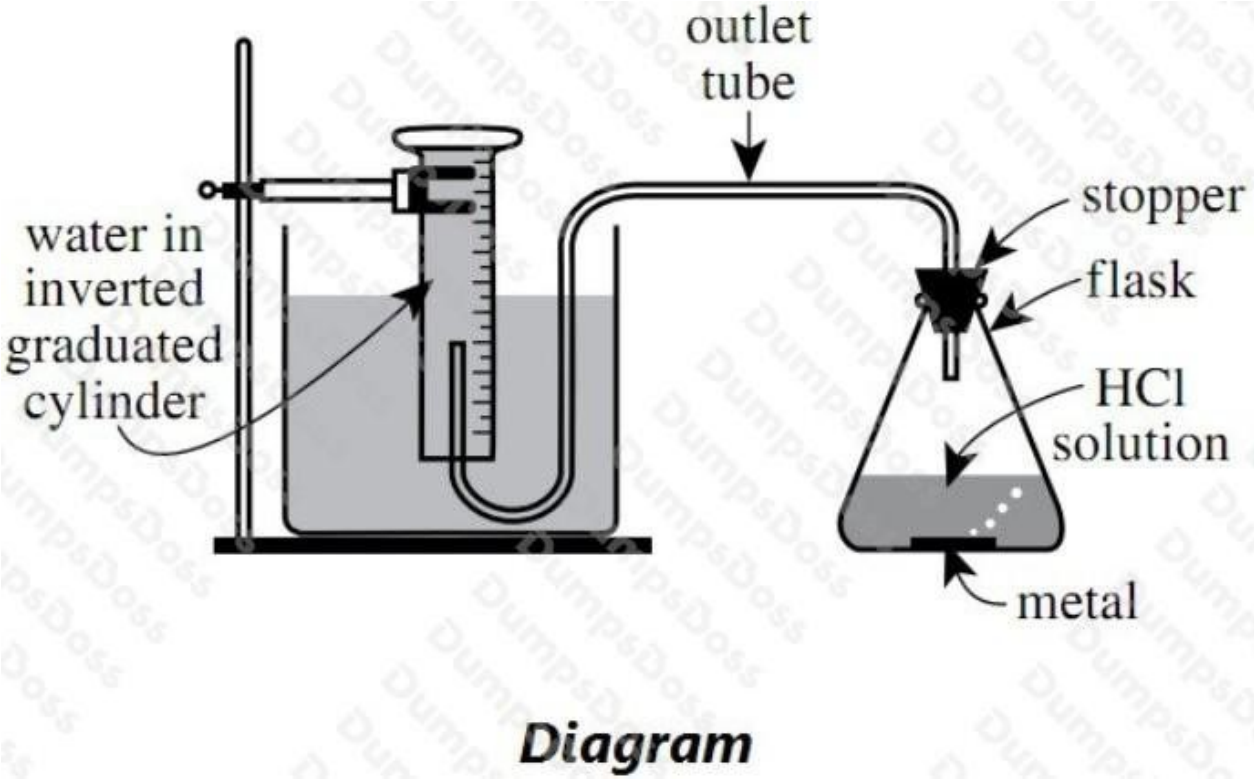
Topic	No. of Questions
Topic 1, English	334
Topic 2, Math	276
Topic 3, Reading	242
Topic 4, Science	203
Total	1055

QUESTION NO: 1

When a solid metal (M) such as iron (Fe), nickel (Ni), or zinc (Zn) is placed in an aqueous hydrochloric acid (HCl) solution, a reaction that produces H_2, gas occurs:

$M + 2HCl \longrightarrow MCl_2 + H_2$

Two experiments were conducted to study the production of H_2 in this reaction. The apparatus shown in the diagram below was used to collect the H_2 gas produced in each trial.



Diagram

As H_2 was produced in the stoppered flask, it exited the flask through the outlet tube and displaced the water that had been trapped in the inverted graduated cylinder. (This displacement occurred because the H_2 did not dissolve in the water.) The volume of water displaced equaled the volume of gas (H_2 and water vapor) collected.

In each trial of the experiments, Steps 1-3 were performed:

1. The apparatus was assembled, and 25 mL of a 4 moles/L HCl solution was poured into the empty flask.

2. A selected mass of Fe, Ni, or Zn was added to the flask, and the stopper was quickly reinserted into the flask.

3. When H_2 production ceased, the volume of water that was displaced from the graduated cylinder was recorded.

The apparatus and its contents were kept at a selected temperature throughout Steps 2 and 3. The atmospheric pressure was 758 mm Hg throughout all 3 steps. Experiment 1

In each trial, a selected mass of Fe, Ni, or Zn was tested at 30°C (see Figure 1).

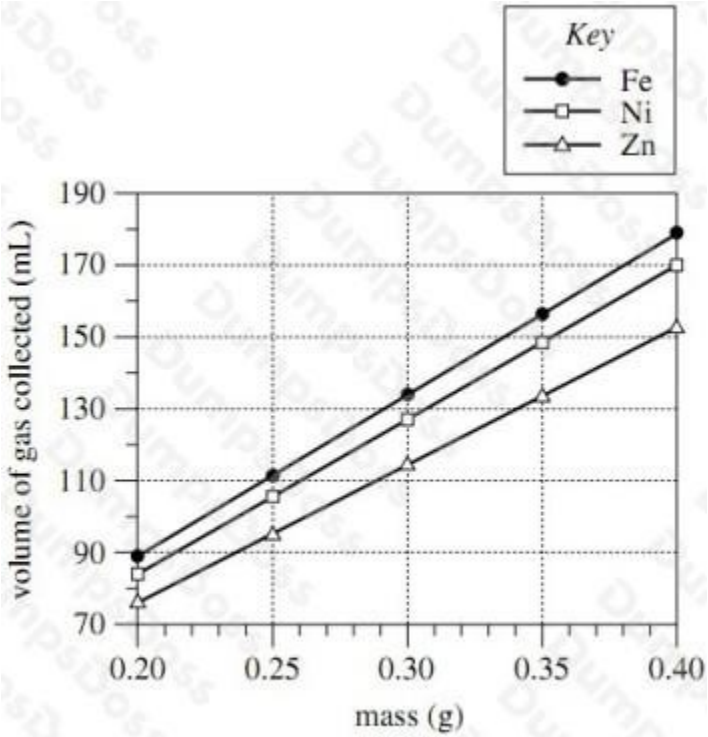


Figure 1

Experiment 2

In each trial, 0.30 g of Fe, Ni, or Zn was tested at a selected temperature (see Figure 2).

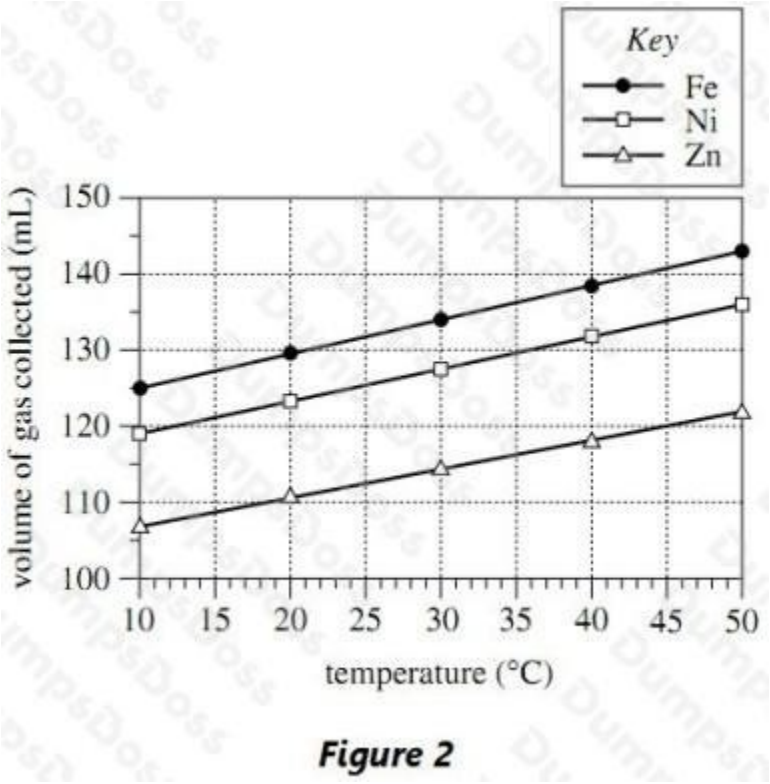


Figure 2

How many temperatures were tested in Experiment 1, and how many temperatures were tested in Experiment 2?

A. Experiment 1: 1; Experiment 2: 1

B. Experiment 1: 1; Experiment 2: 5

C. Experiment 1: 5; Experiment 2: 1

D. Experiment 1: 5; Experiment 2: 5

ANSWER: B

Explanation:

Experiment 1: 1; Experiment 2: 5 is correct. Experiment 1 explicitly states that every trial was conducted at 30°C. Although the metal identity and mass were selected across trials, the temperature was held constant, so only one temperature was tested in that experiment. In experimental-design terms, temperature is a controlled condition for Experiment 1 rather than a variable represented by multiple values.

For Experiment 2, the metal mass was fixed at 0.30 g, while the trials were performed at selected temperatures. Figure 2 presents results at five distinct temperature values; each plotted or tabulated temperature represents a tested experimental condition. Therefore, this experiment tested five temperatures. The question requires distinguishing a constant explicitly specified in the written procedure from the set of values displayed in the experiment's results figure. This is a core ACT Science skill: identifying variables and accurately extracting the number of tested conditions from a passage, table, or graph. See ACT's overview of the science test at ACT Test Descriptions and its official preparation resources at ACT Test Preparation.

QUESTION NO: 2

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Annie Smith Peck

[§1] Since a hundred years, <1> the highest mountains in South America have lured climbers from all over the world. But until 1908, Peru's Mt. Huascaran resisted the efforts of all those who attempted to reach its summit. One mountaineer, Annie Smith Peck, vowed to overcome the obstacles and be the first to the top of Mt. Huascaran. In order to succeed, she would have to organize expeditions – deal with reluctant companions –survive bad weather, and <2> climb steep cliffs of ice and rock.

[§2] Peck was born in the United States in 1850. Although she didn't start mountain climbing until she was in her thirties, it <3> soon became clear that she had found her life's work. A natural mountaineer, Peck was soon setting records on expeditions in North America and Europe. She traveled to Bolivia in 1903 and found Mount Huascaran, which had yet to be surmounted, a challenge she simply could not resist. <4>

[§3] (1) Peck mounted four expeditions and made five attempts before she finally conquered Mt. Huascaran. (2) Between those expeditions, Peck returned to the United States to raise money. (3) She received help from many scientific organizations, including the Museum of Natural History. (4) The Museum had also supported Admiral Peary on his trip to the North Pole. (5) Still, Peck struggled at least as much to raise money as she did climbing <5> her beloved mountains.

[§4] In 1908, Peck scraped together the funds for yet another expedition to Mt. Huascaran. This time, she hired two Swiss guides to assist <6> her with the climb. On their first trip up the mountain's slopes, one of the guides became ill, and the entire team was forced to turn back even though they were very close to the top. Being so close to success was very frustrating for Peck, who could not even prove how close they had come because she had accidentally brought the wrong kind of film and was unable to photograph the climb.

[§5] The team rested for a few days, the guide recovered, and on August 28th, they set off again. The climb was extremely difficult. Steps had to be cut <7>one by one into the steep ice; snow bridges and crevasses had to be carefully crossed. The weather was so cold that everyone suffered from frostbite. When Peck and her two guides were just a short distance from the top, they stopped to determine the exact height of the mountain.

[§6] At that moment, one of the guides took advantage of Peck's distraction and climbed the few remaining feet to the summit so that he was the first to reach the peak. What a jerk! <8>Although Peck was understandably angry, she <9> focused on the triumph of achieving her goal: standing at last on the top of Mt. Huascaran.

<5>:

A. NO CHANGE

B. climbed

C. proving she climbed

D. to climb

ANSWER: D

Explanation:

“to climb” is correct because it creates a balanced comparison between two infinitive phrases: Peck “struggled ... to raise money” and “to climb her beloved mountains.” Both activities are presented as equivalent challenges, so matching their grammatical forms makes the relationship immediately clear and smooth. The sentence means that fundraising demanded at least as much effort from Peck as mountain climbing itself did. Repeating the infinitive marker “to” after “did” also makes the omitted verb phrase explicit: she struggled as much to raise money as she did to climb mountains. This parallel construction is especially effective in an ACT English sentence because it preserves the comparison’s logic while keeping the prose concise. Standard English favors parallel grammatical structures when connected ideas are being compared, listed, or coordinated; parallelism helps readers recognize that the ideas have the same role in the sentence. See the Purdue Online Writing Lab’s guidance on parallel structure and the ACT’s English practice resources.

QUESTION NO: 3

Disequilibrium at the interface of water and air is a factor on which the transfer of heat and water vapor from the ocean to the air depends. The air within about a millimeter of the water is almost saturated with water vapor and the temperature of the air is close to that of the surface water. Irrespective of how small these differences might be, they are crucial, and the disequilibrium is maintained by air near the surface mixing with air higher up, which is typically appreciably cooler and lower in water vapor content. The turbulence, which takes its energy from the wind mixes the air. As the speed of wind increases, so does the turbulence, and consequently the rate of heat and moisture transfer. We can arrive at a detailed understanding of this phenomenon after further study. The transfer of momentum from wind to water, which occurs when waves are formed is an interacting and complicated phenomenon. When waves are made by the wind, it transfers important amounts of energy, which is consequently not available for the production of turbulence.

This passage principally intends to:

A. resolve a controversy

B. attempt a description of a phenomenon

C. sketch a theory

D. reinforce certain research findings

E. tabulate various observations

ANSWER: B

Explanation:

The passage principally intends to **attempt a description of a phenomenon**. Its central focus is the physical process by which heat and water vapor move from the ocean into the atmosphere. The author describes the small but important differences in temperature and water-vapor content between air immediately above the ocean and air at higher levels. The passage then explains how wind-driven turbulence mixes these layers of air and thereby sustains the disequilibrium that permits continued heat and moisture transfer. It further describes the related interaction between wind, water, turbulence, and wave formation, noting that energy transferred into waves affects the energy available for turbulence.

This is an explanatory, process-oriented passage: it identifies relevant conditions, describes the mechanism that links them, and notes that a more detailed understanding would require additional study. That purpose aligns with a broad description of a natural phenomenon rather than with an argument designed to settle a dispute or present results. In ACT Reading questions about a passage’s overall purpose, the best answer captures what the author is doing throughout the passage, not merely one scientific detail. See ACT’s description of the ACT Reading test and its Preparing for the ACT guide.

QUESTION NO: 4

Exercising elicits an acute hormonal response. The magnitude of this response is dependent on the mode and intensity of exercise. Figure 1 shows the concentration of two hormones in response to exercise as measured by researchers in pmol/l and nmol/l (1 pmol/l = .001 nmol/l). Measurements were taken at multiple timestamps before beginning the workout, after the completion of each exercise in the workout, 15 minutes after completing the workout, and 30 minutes after completing the workout. Changes in these hormones were tracked across two different exercise conditions, or modes, defined as MR and FR.

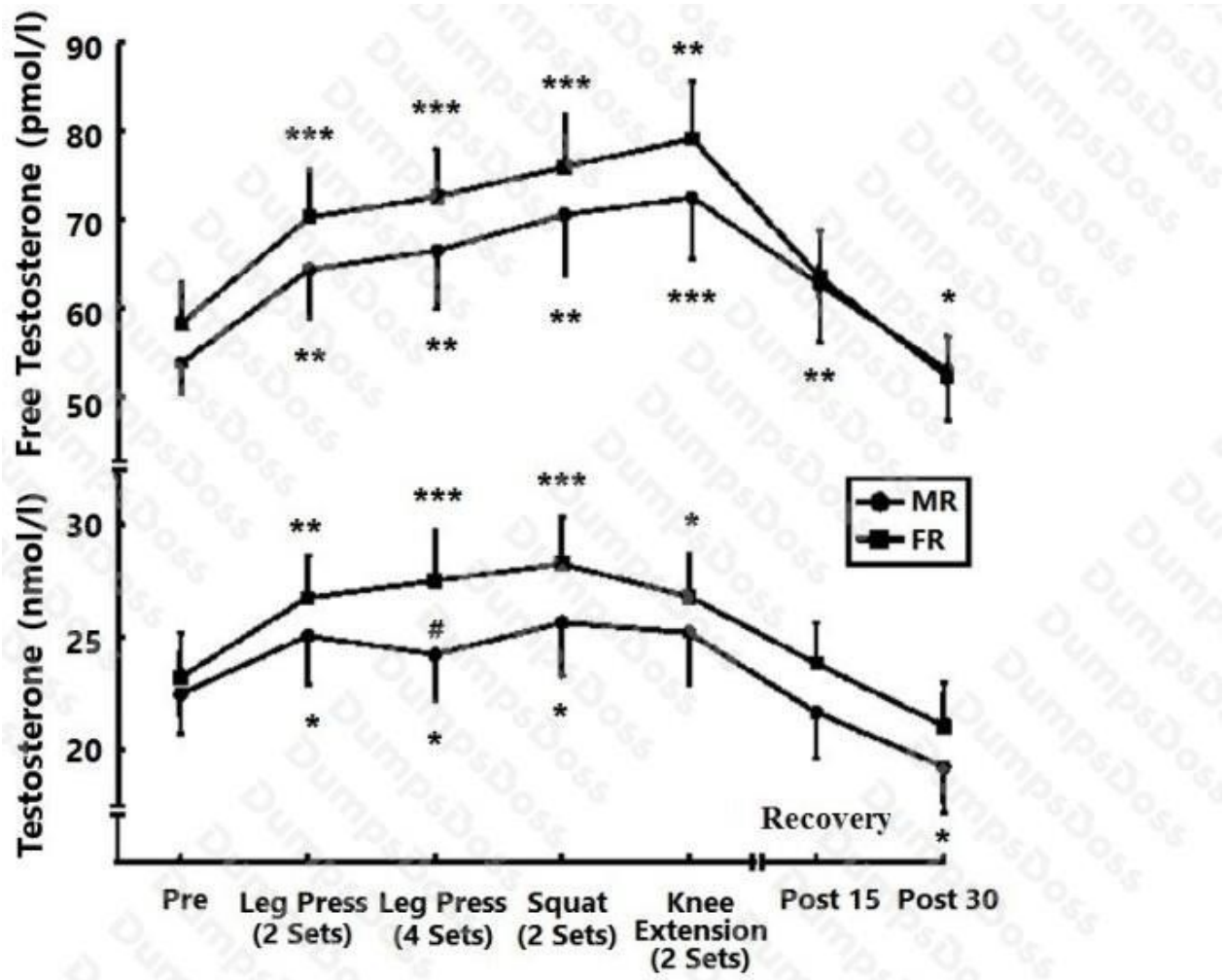


Figure adapted from Acute hormonal and neuromuscular responses and recovery to forced vs. Maximum repetitions multiple resistance exercises by Ahtianinen et al.

Suppose the researchers added another exercise to the end of the workout in the FR condition and measured Free Testosterone concentration at that point. If the current trend continued, what would be the most likely concentration observed at that timestamp?

A. Greater than or equal to 80 nmol/l

B. Between 64 and 78 pmol/l

C. Less than or equal to 64 pmol/l

D. Greater than or equal to 78 pmol/l

ANSWER: D

Explanation:

Greater than or equal to 78 pmol/l is correct because the Free Testosterone measurements for the FR condition rise across the exercise timestamps during the workout. The final plotted in-workout FR value is approximately 76 pmol/l. Continuing the observed upward pattern after an additional exercise would therefore place the next measurement above that

final value. Even using the smallest visible increase between consecutive exercise measurements, the predicted concentration reaches at least about 78 pmol/l. Thus, the stated threshold is the best-supported prediction from the graph.

Careful attention to units is essential when interpreting this result. The graph's Free Testosterone values are reported in pmol/l, and the question specifies that 1 pmol/l equals 0.001 nmol/l. Therefore, a value near 78 pmol/l corresponds to 0.078 nmol/l, not 78 nmol/l. This exercise uses a standard scientific-data skill: identify the relevant data series and condition, follow the direction of the measured trend over the relevant time points, and retain the units shown on the graph. For guidance on interpreting numerical trends and quantitative evidence in ACT Science-style questions, see ACT Science practice questions and the NIST SI units reference.

QUESTION NO: 5

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Gateway Arch

[§1] The skyline of St. Louis, Missouri, is fairly unremarkable, with one huge exception, the <1> Gateway Arch that stands on the banks of the Mississippi. Part of the Jefferson National Expansion Memorial, the Arch is a really cool monument <2> built to honor St. Louis' role as the gateway to the West.

[§2] Construction on the 630-foot high structure began, in 1961, <3> and was completed four years later in 1965. The monument includes an underground visitor center that explores westward expansion through galleries and a theater. Two passenger trams take visitors to the Observation Room and the Museum of Westward Expansion at the top.

[§3] In 1947, a group of interested citizens known as the Jefferson National Expansion Memorial Association held a nationwide competition to select a design for a new monument that would celebrate <4> the growth of the United States. Other U.S. monuments are spires, statues, or imposed buildings, <5> but the winner of this contest was a plan for a completely unique structure. The man that <6> submitted the winning design, Eero Saarinen, later became a famous architect. In designing the Arch, Saarinen wanted to "create a monument which would have lasting significance and would be a landmark of our time."

[§4] The Gateway Arch is a masterpiece of engineering, a monument even taller than the Great Pyramid in Egypt, and on its own way, <7> at least as majestic. The Gateway is an inverted catenary curve, the same shape that a heavy chain will form if suspended between two points. Covered from top to bottom with sleek stainless steel coating, <8> the Arch often reflects dazzling bursts of sunlight. In a beautiful display of symmetry, the height of the arch is the same as the distance between the legs at ground level.

<7>:

A. NO CHANGE

B. and, in its own way,

C. and – in its own way;

D. and in it's own way

ANSWER: B

Explanation:

The best revision is *and, in its own way,*. The established idiom is "in its own way," meaning according to the distinctive characteristics or merits of the thing being discussed. Here, the phrase qualifies the claim that the Gateway Arch is "at least as majestic" as the Great Pyramid: the Arch is majestic differently, rather than identically. The possessive pronoun must be *its*, without an apostrophe, because it refers to the Arch. "It's" is a contraction meaning "it is" or "it has," so it cannot show possession.

Commas correctly set off "in its own way" as a nonessential interrupting phrase. If the phrase is removed, the sentence still has a complete core meaning: the Arch is taller than the Great Pyramid and at least as majestic. The comma before *and* also supports the sentence's coordinated comparison, making the inserted phrase read smoothly and clearly. This editing choice

follows standard guidance that parenthetical or nonessential interrupters should be enclosed by punctuation. See the Purdue OWL guidance on commas with nonessential elements and the Merriam-Webster entry for “its”.

QUESTION NO: 6

WHAT IS EQUAL EMPLOYMENT OPPORTUNITY?

SmithCo, Inc.

Associate Manual

Commitment to Equal Employment Opportunity

Equal Employment Opportunity

Equal Opportunity is the expressed policy of SmithCo. Our policy is to select the best-qualified person for each position in the organization and to conduct all business relationships without prejudice. SmithCo is committed to the principles of equal employment opportunity for all employees and applicants for employment. Advancement opportunities and employment decisions will be made without regard to race, creed, color, religion, sex, national origin, ancestry, age, physical or mental handicap, veteran or military status, or any other characteristic protected under federal, state, or local law.

Managers are expected to seek out a diverse pool of candidates for consideration when making hiring decisions. SmithCo also develops an annual Affirmative Action program, which is a federal requirement due to our status as a government contractor. The leadership team plays an active role in demonstrating SmithCo’s commitment by providing equal employment opportunities at all levels of employment. Managers and employees are advised to meet with the HR manager for assistance in meeting the standards set in this policy.

Equal Employment Opportunity Applies Throughout The Employment Process

To advance the principles of equal employment opportunity, SmithCo also extends this policy to every phase of the employment process including, but not limited to, recruitment, selection, placement, transfer, training and development, promotion, compensation, benefits, layoffs, termination, and all other conditions or benefits of employment. All employees are expected to abide by and promote this policy of equal employment opportunity within the organization, as well as with those who have a business relationship with SmithCo.

Equal Employment Opportunity Requires the Participation of All Associates

While overall authority for implementing an Equal Employment Opportunity policy is assigned to the Vice President of Human Resources, an effective equal employment opportunity program cannot be achieved without the support of all associates. Any associate who feels they have been denied equal opportunity or subjected to discrimination should consult with their manager or HR representative. SmithCo’s Employee Assistance Program also provides assistance with these matters.

What is the main purpose of SmithCo’s equal employment opportunity policy?

A. to lessen the chance of lawsuits against SmithCo for discrimination

B. to prevent sexual harassment

C. to document out the rules for termination

D. to create and maintain a workplace free from discrimination

E. to ensure qualified employees are hired

ANSWER: D

Explanation:

The main purpose is **to create and maintain a workplace free from discrimination**. SmithCo’s policy commits the organization to making employment and advancement decisions without prejudice or regard to protected characteristics. It applies this commitment broadly, covering applicants and employees and extending across the employment relationship, including recruiting, hiring, placement, training, promotion, compensation, benefits, layoffs, and termination. Thus, the policy

is intended to ensure that people receive equal opportunity throughout all employment practices and that discriminatory treatment is not part of workplace decision-making.

This purpose aligns with the role of equal employment opportunity laws in the United States. The U.S. Equal Employment Opportunity Commission explains that federal laws prohibit discrimination in employment based on protected characteristics, and these protections cover important aspects of the employment process. SmithCo's statement also assigns responsibility to leadership, managers, and associates and provides a process for employees who believe they have experienced unequal treatment to seek assistance. These features support an organizational environment in which equal access to employment opportunities is actively maintained. See the EEOC overview of employment discrimination laws and the EEOC's guidance on protected individuals and employment discrimination.

QUESTION NO: 7

A teacher provided the table below to the students in a science class. The table gives 5 properties for each of Sample A-H. The students were told to assume that each sample is a completely solid cube composed of a single hypothetical pure substance.

Sample	Mass (g)	Volume (cm^3)	Density (g/cm^3)	Melting point (°C)	Boiling point (°C)
A	8.0	4.0	2.0	126	747
B	8.0	4.0	2.0	342	959
C	6.0	3.0	2.0	237	885
D	6.0	3.0	2.0	237	885
E	8.0	2.0	4.0	126	747
F	8.0	2.0	4.0	126	747
G	4.0	1.0	4.0	126	747
H	4.0	1.0	4.0	342	959

Note: Assume that mass, volume, and density were determined at 20°C and that all 5 properties were determined at 1 atmosphere (atm) of pressure.

The teacher asked each of 4 students to explain how these data could be used to predict which samples are composed of the same substance.

Student 1

If 2 samples have the same values for all 5 properties, they are composed of the same substance. If 2 samples have different values for any of the 5 properties, they are composed of different substances.

Student 2

If 2 samples have the same values for any 3 or more of the 5 properties, they are composed of the same substance. If 2 samples have the same values for fewer than 3 of the 5 properties, they are composed of different substances.

Student 3

If 2 samples have the same mass, volume, and density, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither melting point nor boiling point, by itself, can distinguish between substances.

Student 4

If 2 samples have the same density, melting point, and boiling point, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither mass nor volume, by itself, can distinguish between substances.

Which of Students 2, 3, and 4 would be likely to agree that Sample A and Sample B are composed of the same substance?

A. Students 2 and 3 only

B. Students 2 and 4 only

C. Students 3 and 4 only

D. Students 2, 3, and 4

ANSWER: B

Explanation:

Students 2 and 4 only is correct. The table shows that Sample A and Sample B have identical values for density, melting point, and boiling point, while their masses and volumes differ. Under Student 2's rule, matching on three of the five listed properties is enough to predict that the samples are the same substance. Because these samples match on exactly three properties, Student 2 would classify them together.

Student 4 would reach the same conclusion because the three properties used in that student's rule—density, melting point, and boiling point—are all the same for Sample A and Sample B. These are intensive properties: their values do not depend on how much of a pure substance is present. Mass and volume are instead extensive properties, so they can change when the amount of the same material changes. For solid cubes of one pure substance, a larger or smaller cube can therefore have a different mass and volume while retaining the same density and phase-change temperatures. This relationship is consistent with standard chemistry definitions of intensive properties and density; see OpenStax Chemistry 2e and NIST's density reference.

QUESTION NO: 8

Laura plans to paint the 8-foot-high rectangular walls of her room, and before she buys paint she needs to know the area of the wall surface to be painted. Two walls are 10 feet wide, and the other 2 walls are 15 feet wide. The combined area of the 1 window and the 1 door in her room is 60 square feet. What is the area, in square feet, of the wall surface Laura plans to paint?

A. 200

B. 340

C. 360

D. 390

E. 400

ANSWER: B

Explanation:

340 is correct. Each wall is a rectangle, so its area is found by multiplying its width by the common height of 8 feet. The two 10-foot-wide walls have a combined area of 2 × 10 × 8 = 160 square feet. The two 15-foot-wide walls have a combined area of 2 × 15 × 8 = 240 square feet. Therefore, the total area of all four walls before accounting for openings is 160 + 240 = 400 square feet.

Because Laura will not paint the window or the door, their combined 60 square feet must be removed from the full wall area. Subtracting gives 400 − 60 = 340 square feet. This method applies the rectangle-area relationship, area = length × width, while keeping all measurements in feet so the resulting unit is square feet. The calculation also correctly treats the door and window as parts of the wall surface that are excluded from the paintable area. For additional ACT preparation resources, see ACT Test Preparation and the ACT overview.

QUESTION NO: 9

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Haiti

[§1] Although my friends and family were skeptical of whether <1> I would be safe, I boarded the plane in New York boldly <2> and flew to Haiti. My college roommate had agreed to take medical supplies to a rural clinic where his brother was a physician, and I agreed to go and help.

[§2] When me and my roommate <3> landed at the airport in the capital Port au Prince, the chaos inside the airport was frightening. Dozens of men approached us while gesturing to our luggage, and yelling at us in Creole. They wanted us to select their taxis. I was thrilled <4> when my roommate smiled at someone who called our names through the crowd.

[§3] Papi, our designated transporter, was a Haitian man in his early twenties who works <5> for the physician. He warmly welcomed us to his country, and seemed to have a great sense of humor. <6> He laughed nonstop during our ride through the capital city. Once we were on the open highway, Papi taught us basic Creole greetings to pass the time during our excessively long four-hour commute. <7>

[§4] The mountainous town where we would spend the week was beautiful, and I immediately fell in love with the place and its people. The views rocked! <8> Even though I could not fluently speak Creole, I made the most of my time with the land and its inhabitants. Several daily tasks kept me busy that week. The medical clinic was a modest two-room building, and their <9> staff needed help reorganizing the supply pantry. I removed, counted, sorted, and restocked supplies, <10> before adding the additional resources we brought from the United States. After I cleaned and organized the supply pantry, I assisted a visiting nutritionist with distributing vitamins to the locals. <11>

[§5] Each evening, two dozen young children would sit on the porch where my roommate and I stayed. They laughed constantly, they <12> always found joy in the simplest of things. They did teach <13> us to count in Creole and read children's stories to us in French. They invited us to kick balls with them and chase yard chickens. Even though they did not have many toys, the children entertained one another with conversation, laughter and storytelling.

[§6] When it was time to leave Haiti and return to New York, I was sad to say goodbye. Although my roommate and I delivered medical supplies to their community, the people gave us memories that will last the rest of our lives. <14>

<10>:

A. NO CHANGE

B. sorted, and restocked, supplies

C. sorted and restocked supplies

D. sorted and restocked, supplies

ANSWER: A

Explanation:

"NO CHANGE" correctly preserves a clear series of four actions: "removed, counted, sorted, and restocked." Each verb shares the same object, "supplies," so the sentence efficiently communicates the sequence of work performed in the pantry. Commas separate the individual actions in the series, including the comma before "and," which is acceptable and especially helpful in a list containing several coordinated elements. The comma after "supplies" correctly marks the transition from the completed series of actions to the following phrase, "before adding the additional resources we brought from the United States." Thus, the sentence reads smoothly and makes clear that organizing the existing supplies happened before the new resources were added. This punctuation also fits the passage's straightforward first-person narrative style, which

emphasizes the practical tasks the writer completed at the clinic. Standard guidance recognizes commas as a conventional way to separate three or more items in a series; see the Purdue Online Writing Lab's guidance on commas in series. For additional ACT English conventions context, consult ACT English practice questions.

QUESTION NO: 10

Cities across the world are essentially blends of smaller cultural environments that lead people to have vastly different experiences. Each city typically contains a broad spectrum of dining establishments along with various art institutions like museums and theatres. Yet with all these blends of dining, art and night lives, what is the one characteristic that can distinguish a city?

History. The undeniably unique history of each city provides rich traditions and a bond between the local people that overshadows any other city's mélange of dining and art institutions.

In context, which word most closely defines mélange?

A. frivolous

B. tradition

C. assortment

D. opportunity

E. brochure

ANSWER: C

Explanation:

The correct answer is **assortment**. In this passage, *mélange* describes the combined range of a city's dining establishments and art institutions. The surrounding wording supplies direct context clues: cities contain a "broad spectrum" of restaurants and "various" cultural institutions, and the passage also refers to "blends" of dining, art, and nightlife. Together, these details show that *mélange* means a mixture or collection of different kinds of things. "Assortment" most closely conveys that meaning because it refers to a varied collection or selection. The word comes from French and is used in English to mean a diverse mixture, especially one made up of distinct elements. In the passage, each city may offer an assortment of cultural and entertainment choices, but its history is presented as the more distinctive quality. This is a context-vocabulary question: rather than relying only on prior knowledge of the word, the reader can infer its meaning from the repeated ideas of variety, range, and blended cultural offerings. See Merriam-Webster's definition of mélange and the Cambridge Dictionary entry for assortment.

QUESTION NO: 11

A music store offers customized guitars. A buyer has four choices for the neck of the guitar, two choices for the body of the guitar, and six choices for the color of the guitar. The music store offers

A. 12 different guitars.

B. 16 different guitars.

C. 24 different guitars.

D. 36 different guitars.

E. 48 different guitars.

ANSWER: E

Explanation:

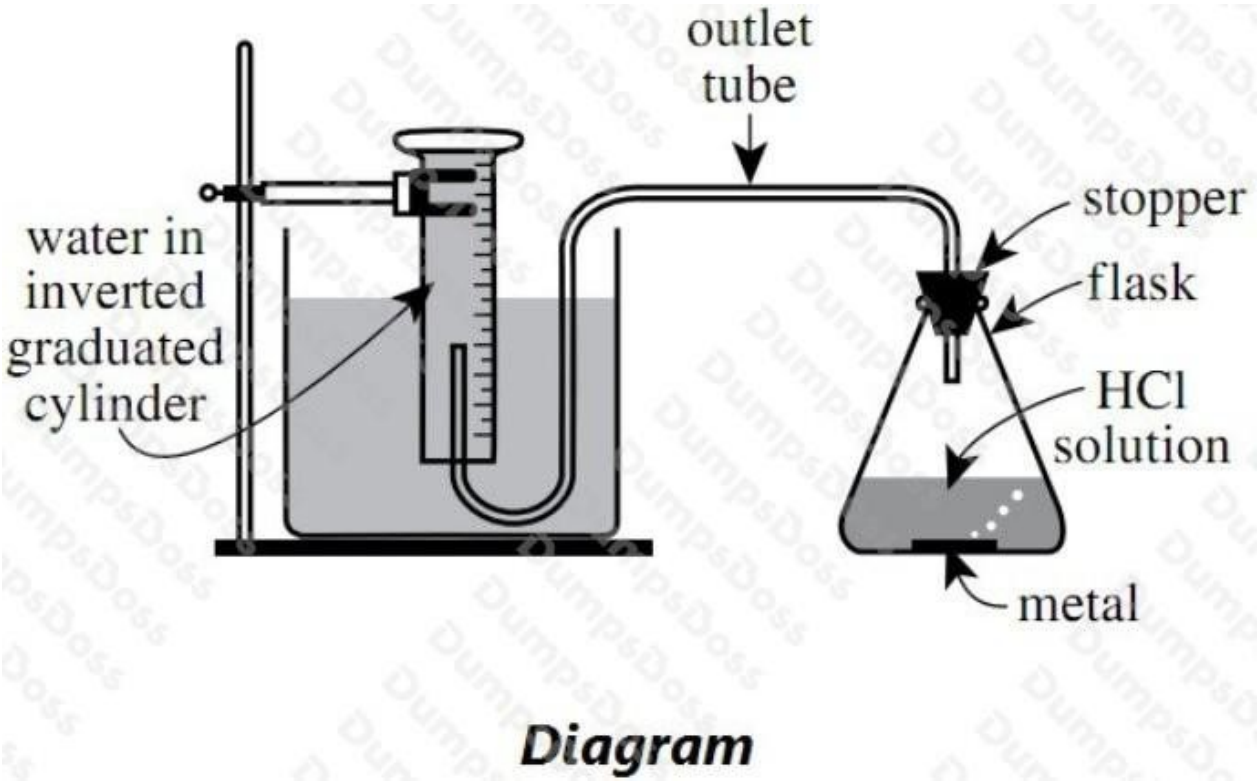
The correct answer is **48 different guitars.** Each customized guitar is created by making one independent choice for each of three features: neck, body, and color. The fundamental counting principle says that when a process consists of successive independent choices, the total number of possible outcomes is found by multiplying the number of choices available at each step. Here, there are 4 choices for the neck. For every neck choice, there are 2 possible body choices, producing 4 × 2 = 8 neck-and-body combinations. Each of those 8 combinations can then be finished in any of 6 colors. Therefore, the total number of unique guitar configurations is 4 × 2 × 6 = 48. Every distinct combination of one neck, one body, and one color represents a different guitar the buyer may order. This multiplication approach is commonly called the multiplication rule or fundamental counting principle; it is the appropriate method when selecting one item from each of several categories. See the OpenStax explanation of the counting principle and the Encyclopaedia Britannica overview of basic combinatorial principles.

QUESTION NO: 12

When a solid metal (M) such as iron (Fe), nickel (Ni), or zinc (Zn) is placed in an aqueous hydrochloric acid (HCl) solution, a reaction that produces H2, gas occurs:

M + 2HCl —> MCl2 + H2

Two experiments were conducted to study the production of H2 in this reaction. The apparatus shown in the diagram below was used to collect the H2 gas produced in each trial.



Diagram

As H2 was produced in the stoppered flask, it exited the flask through the outlet tube and displaced the water that had been trapped in the inverted graduated cylinder. (This displacement occurred because the H2 did not dissolve in the water.) The volume of water displaced equaled the volume of gas (H2 and water vapor) collected.

In each trial of the experiments, Steps 1-3 were performed:

1. The apparatus was assembled, and 25 mL of a 4 moles/L HCl solution was poured into the empty flask.

2. A selected mass of Fe, Ni, or Zn was added to the flask, and the stopper was quickly reinserted into the flask.

3. When H2 production ceased, the volume of water that was displaced from the graduated cylinder was recorded.

The apparatus and its contents were kept at a selected temperature throughout Steps 2 and 3. The atmospheric pressure was 758 mm Hg throughout all 3 steps. Experiment 1

In each trial, a selected mass of Fe, Ni, or Zn was tested at 30°C (see Figure 1).

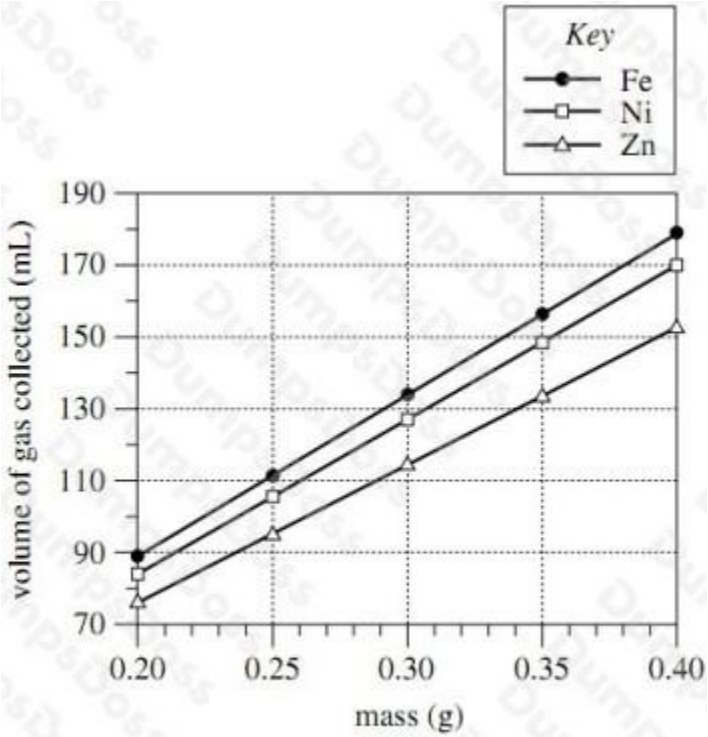


Figure 1

Experiment 2

In each trial, 0.30 g of Fe, Ni, or Zn was tested at a selected temperature (see Figure 2).

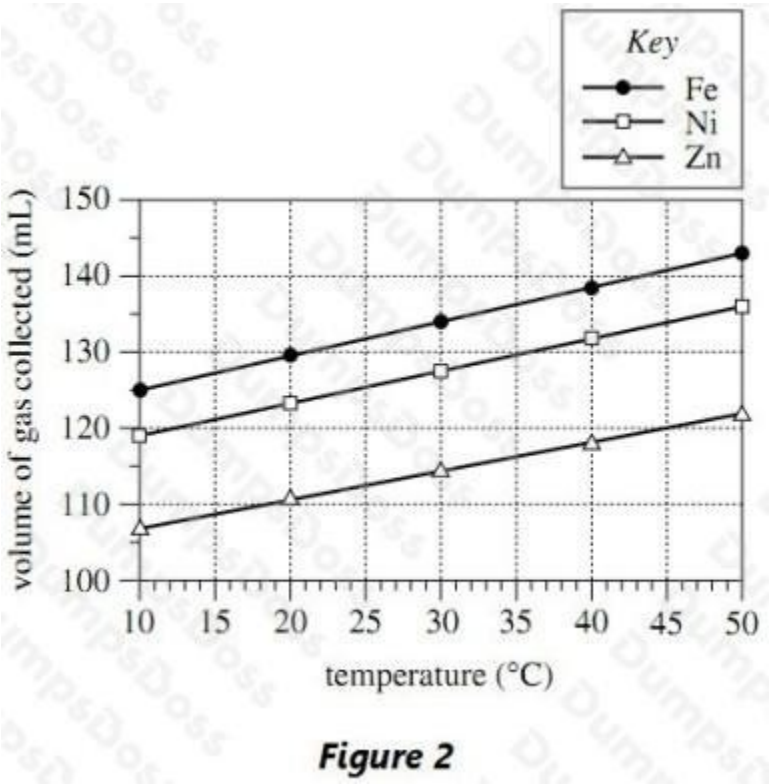


Figure 2

Which of the following statements describes a difference between Experiments 1 and 2? In Experiment 1:

A. only Fe was tested, but in Experiment 2, Fe, Ni, and Zn were tested.

B. Fe, Ni, and Zn were tested, but in Experiment 2, only Fe was tested.

C. the same mass value of each metal was tested, but in Experiment 2, multiple mass values of each metal were tested.

D. multiple mass values of each metal were tested, but in Experiment 2, the same mass value of each metal was tested.

ANSWER: D

Explanation:

“multiple mass values of each metal were tested, but in Experiment 2, the same mass value of each metal was tested” correctly identifies the experimental-design difference. Experiment 1 held temperature constant at 30°C while using selected masses of iron, nickel, and zinc. As indicated by Figure 1, the trials for each metal used more than one mass value, allowing the investigators to examine how the amount of a particular metal affected the collected gas volume under the same temperature conditions.

Experiment 2 instead specifies a fixed mass: 0.30 g of each metal was used in every trial. The selected variable in that experiment was temperature, so keeping the metal mass identical for iron, nickel, and zinc isolates the effect of temperature on hydrogen-gas production. This is an application of controlled experimentation: when one independent variable is being investigated, relevant quantities such as the amount of reactant are kept constant so changes in the measured outcome can be meaningfully associated with the variable being tested. The ACT describes its Science test as assessing interpretation, analysis, evaluation, reasoning, and problem-solving using scientific information: ACT Science Test Prep. General guidance on identifying variables and controls in experiments is available from Khan Academy.

QUESTION NO: 13

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Gateway Arch

[§1] The skyline of St. Louis, Missouri, is fairly unremarkable, with one huge exception, the <1> Gateway Arch that stands on the banks of the Mississippi. Part of the Jefferson National Expansion Memorial, the Arch is a really cool monument <2> built to honor St. Louis’ role as the gateway to the West.

[§2] Construction on the 630-foot high structure began, in 1961, <3> and was completed four years later in 1965. The monument includes an underground visitor center that explores westward expansion through galleries and a theater. Two passenger trams take visitors to the Observation Room and the Museum of Westward Expansion at the top.

[§3] In 1947, a group of interested citizens known as the Jefferson National Expansion Memorial Association held a nationwide competition to select a design for a new monument that would celebrate <4> the growth of the United States. Other U.S. monuments are spires, statues, or imposed buildings, <5> but the winner of this contest was a plan for a completely unique structure. The man that <6> submitted the winning design, Eero Saarinen, later became a famous architect. In designing the Arch, Saarinen wanted to “create a monument which would have lasting significance and would be a landmark of our time.”

[§4] The Gateway Arch is a masterpiece of engineering, a monument even taller than the Great Pyramid in Egypt, and on its own way, <7> at least as majestic. The Gateway is an inverted catenary curve, the same shape that a heavy chain will form if suspended between two points. Covered from top to bottom with sleek stainless steel coating, <8> the Arch often reflects dazzling bursts of sunlight. In a beautiful display of symmetry, the height of the arch is the same as the distance between the legs at ground level.

<5>:

A. NO CHANGE

B. imposing buildings

C. buildings that imposed

D. buildings that are imposed

ANSWER: B

Explanation:

“imposing buildings” is correct because it uses *imposing* as an adjective that directly describes the noun *buildings*. In context, the sentence lists familiar categories of monuments—“spires, statues, or imposing buildings”—before contrasting them with Saarinen’s distinctive plan for the Gateway Arch. The adjective means grand, impressive, or awe-inspiring, which precisely conveys the intended description of monumental architecture and fits the passage’s appreciative tone.

The wording also maintains a clear, balanced series. Each item in the list is a noun phrase: “spires,” “statues,” and “imposing buildings.” This parallel structure makes the comparison easy to follow and keeps the sentence concise. Standard written English commonly uses a present participle ending in *-ing* as an adjective in this way, especially when describing a characteristic associated with a noun. ACT English questions regularly assess clarity, grammatical modification, concision, and parallelism; this revision satisfies all of those goals while preserving the author’s meaning. For guidance on ACT English conventions, see ACT English practice resources. For a grammar reference on modifiers and adjective use, see Purdue OWL’s participles guide.

QUESTION NO: 14

A line has a y-intercept of −6 and an x-intercept of 9. Which of the following is a point on the line?

A. (–6, −10)

B. (1, 3)

C. (0, 9)

D. (3, −8)

E. (6, 13)

ANSWER: A

Explanation:

The point **(–6, −10)** is on the line. A y-intercept of −6 means that the line passes through (0, −6), and an x-intercept of 9 means that it passes through (9, 0). Using these two intercept points, the slope is the change in y divided by the change in x: (0 − (−6)) / (9 − 0) = 6/9 = 2/3. Therefore, the line can be written in slope-intercept form as y = (2/3)x − 6. Substituting an x-coordinate of −6 gives y = (2/3)(−6) − 6 = −4 − 6 = −10. Thus, the ordered pair (−6, −10) satisfies the line’s equation and is a point on the line. This approach—identifying intercepts, finding slope, writing or using the equation, and checking a coordinate pair—is an effective way to solve coordinate-plane questions on the ACT Math test. See ACT’s overview of the Math section at ACT Math Test Preparation and Khan Academy’s explanation of slope-intercept form at Graphing lines in slope-intercept form.

QUESTION NO: 15

If m = 6, then the expression $\frac{m^2}{3} - 4m + 10$ is equal to

A. −12

B. −2

C. 6

D. 12

E. 22

ANSWER: B

Explanation:

The value is **−2**. Substitute 6 for every occurrence of *m* in the displayed expression, retaining all grouping symbols and signs exactly as shown. Then perform the arithmetic in the required order: evaluate any operations within grouping symbols first, complete multiplication or division as applicable, and finally combine the resulting terms. This process gives a negative result because the expression's subtraction or negative term has a greater magnitude than the positive quantity remaining after substitution. The simplified numerical value is therefore −2.

This is the standard approach for an ACT-style algebra evaluation question: translate the given variable value directly into the expression, use order of operations carefully, and keep negative signs attached to their terms throughout the calculation. The ACT Mathematics test includes problems involving numerical and algebraic expressions and expects accurate use of basic operations and signed numbers. See the ACT's Mathematics practice resources and its ACT test overview for further preparation guidance.

QUESTION NO: 16

Excerpt from http://www.bbc.co.uk/science/0/21143412 Why can't we beat viruses?

Every winter, cold and flu sweep across the country, bringing aches, runny noses and fever to millions. The flu virus can kill vulnerable people and a full-blown pandemic can cause a national health crisis.

Scientists have been studying viruses for years. Some, like measles and smallpox, can be defeated with vaccines and drugs.

But some viruses return every year to wreak havoc. So why are they so hard to beat?

How a virus works

Viruses are about a hundred times smaller than human cells. They come in many different shapes and are present wherever there are cells to infect. In fact, viruses are the most common biological unit on Earth, outnumbering all other types put together.

When a virus enters our body it tries to attack a cell.

If our immune system recognises the virus as an intruder, it will be destroyed before the virus can gain entry to a cell. If not, the process of infection begins.

Once inside the cell, the virus can hijack the cell's own replication machinery, which starts to make many copies of the virus. These viruses burst out of the cell, destroying it, and will attempt to infect many more cells unless tackled by the immune system. The infection can also start to spread to other people.

This can happen fast, with devastating consequences. The 1918 Spanish flu was one of the most aggressive viral pandemics in recent history. It is thought to have caused up to 50 million deaths worldwide.

Stopping the virus in its tracks

The human immune system is remarkably effective at dealing with viral invaders.

Some of the symptoms caused by viruses – such as fever, vomiting and tiredness – are a result of the body's defence mechanisms. In many cases of flu and cold the immune system destroys the infection.

The immune response leads to something called acquired immunity – the body 'remembers' viruses so that it can quickly destroy them, should they return, and also make us resistant to them in future. A single case of measles as a child, for example, gives us lifelong resistance.

Scientists have used this concept to protect people against viruses, with some notable success. By 'tricking' our immune systems into recognising viruses, without actually getting infected, we can develop effective resistance to real viruses.

In the 17th century, a method of smallpox immunisation saw people snort or rub dried smallpox scabs into their skin to create an immune response, which then protected them from contracting the virus.

Then in 1796, British physician Edward Jenner developed the first vaccine (for smallpox) which led to a complete eradication of the disease by 1980.

This was a milestone in the history of medical advances. For the first time ever, the World Health Organisation announced the total global eradication of a once deadly disease.

So why can't vaccination work against all types of viruses?

Our immune system works by recognising the proteins on the surface of the virus. But in certain types of virus, these proteins keep changing as the virus mutates, so a vaccine developed one year might not work the next.

Viruses like HIV have proved impossible to develop any kind of vaccine for at all.

Drugs are another line of defence. Unfortunately, they are less effective against viruses than they are against bacteria. Antibiotic drugs kill bacteria by disrupting their cell walls. But virus' external covering, known as the viral envelope, is almost identical to the host cell's membranes, making them difficult to target.

Some anti-viral drugs have been developed. They work by disrupting a part of the virus' lifecycle. Some interfere with the virus' attachment to the cell; others stop the virus' genetic material being incorporated inside the host cell.

Used in combination, some antiviral drugs have proved effective against specific viruses. Anti-viral drugs can dramatically prolong the lives of people affected by HIV

What we can do to reduce the risk?

Because of the limitations of vaccines and drugs, doctors and health protection agencies often recommend 'good practice' aimed at reducing the chance of infection. Staying at home when infected will avoid spreading the infection to others, and minimising contact with virus particles by thoroughly washing hands and cleaning surfaces will limit the spread of the virus to others.

Viruses are incredibly simple organisms but are extremely effective at infecting us. We may never be able to totally beat viruses, but by harnessing the power of vaccination, the latest anti-virals and adopting the right behaviour, we stand a good chance of keeping one step ahead of viruses' most harmful effects.

How are drugs effective at stopping viruses?

A. They disrupt cell walls of the virus.

B. They disrupt a part of the virus' lifecycle.

C. They help facilitate the virus' attachment to the cell.

D. They aid the virus' genetic material in being incorporated inside the host cell.

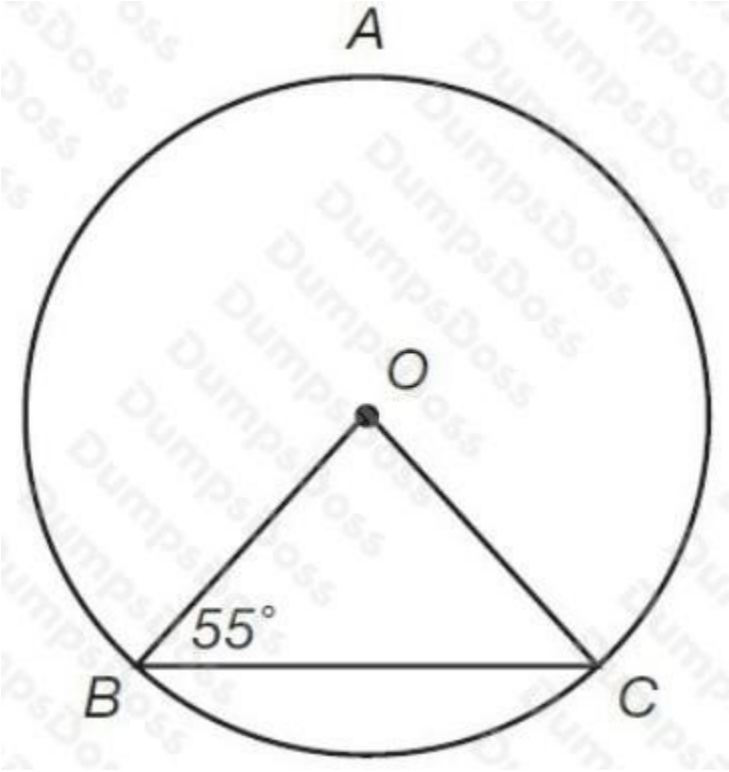
ANSWER: B

Explanation:

They disrupt a part of the virus' lifecycle. The passage directly states that antiviral drugs work by disrupting a stage of the viral life cycle. Viruses must complete a sequence of processes to produce new virus particles: they attach to a host cell, enter it, use cellular machinery to copy their genetic material and proteins, assemble new particles, and release them. Interfering with any essential stage can reduce or stop viral replication, limiting the infection's ability to spread through the body.

The excerpt specifically identifies two examples of this approach: certain antiviral medicines interfere with a virus's attachment to a cell, while others prevent viral genetic material from being incorporated within the host cell. This reflects the broader medical principle that antivirals target particular viral functions or replication stages rather than broadly destroying viruses. The U.S. Food and Drug Administration explains that antiviral drugs are medicines used to treat some viral infections and can help reduce viral activity and illness when used appropriately. The Centers for Disease Control and Prevention likewise notes that influenza antiviral drugs fight flu by preventing the virus from reproducing in the body. See the FDA overview of antiviral drugs and the CDC guidance on influenza antivirals.

QUESTION NO: 17



In the diagram above, $\overline{OB} \cong \overline{OC}$. Which of the following is the measure of minor arc BC?

A. 27.5º

B. 45º

C. 55º

D. 70º

E. 110º

ANSWER: D

Explanation:

The measure of minor arc BC is **70º**. The diagram indicates that segments OB and OC are congruent radii, so triangle OBC is isosceles. Therefore, the base angles opposite those equal sides—at B and C—have equal measures. Since the angle at B is given as 55º, the angle at C is also 55º. The sum of the interior angles of a triangle is 180º, so the central angle at O is 180º − 55º − 55º = 70º.

Points B and C lie on the circle, and O is the center, making angle BOC a central angle. A central angle and the minor arc it intercepts have equal measures in degrees. Because angle BOC intercepts minor arc BC, the arc has the same measure as the 70º central angle. This uses the standard central-angle theorem described in Khan Academy's central angles lesson and the circle-angle relationships summarized by OpenStax.

QUESTION NO: 18

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Glass Castle (excerpt)

By Jeannette Walls

[§1] I never believe <1> in Santa Claus. None of us kids did. Mom and Dad refused to let us. They couldn't afford expensive presents and they didn't want us to think we weren't as good as other kids who, on Christmas morning, <2> found all sorts of fancy toys under the tree that were supposedly left by Santa Claus.

[§2] Dad had lost his job at the gypsum, and when Christmas came that year, we had no money at all. On Christmas Eve, Dad took each one of we kids <3> out into the desert night one by one. [§3] "Pick out your favorite star", Dad said. <4> [§4] "I like that one!" I said.

[§5] Dad grinned, "That's Venus," he said. He explained to me that planets glowed because reflected light was constant and stars twinkled because their light pulsed.

[§6] "I like it anyway" I said. <5>

[§7] "What the hell," Dad said. "It's Christmas. You can have a planet if you want." [§8] And he gave me Venus.

[§9] Venus didn't have any moons or satellites or even a magnetic field, but it did have an atmosphere sort of similar to Earth's, except it was super-hot – about 500 degrees or more. <6> "So,"

Dad said, "when the sun starts to burn out and earth <7> turns cold, everyone might want to move to Venus to get warm. And they'll have to get permission from your descendants first." <8>

[§10] We laughed about all the kids who believed in the Santa myth and got nothing for Christmas but a bunch of cheap plastic toys. <9>

[§11] "Years from now, when all the junk they got is broken and long forgotten," Dad said, "you'll still have your stars." <10>

<4>:

A. NO CHANGE

B. favorite star," Dad said.

C. favorite, star", Dad said.

D. favorite star, Dad said.

ANSWER: B

Explanation:

The correct wording is *favorite star," Dad said.* In standard American English, a comma that concludes quoted dialogue and introduces a dialogue tag is placed inside the closing quotation mark. Here, the spoken sentence is "Pick out your favorite star," and *Dad said* identifies the speaker. Because the quote is followed by that attribution rather than ending as an independent sentence, the comma belongs directly after *star*, before the closing quotation mark. This punctuation creates a smooth, conventional connection between the character's words and the narration identifying who spoke them. The sentence therefore correctly reads: "Pick out your favorite star," Dad said. This convention applies consistently in American published prose and is especially important in ACT English questions, which test standard written-English punctuation and dialogue formatting. The ACT's English section specifically assesses conventions of standard English, including punctuation and sentence structure. See the ACT test description and the Merriam-Webster guide to quotation-mark punctuation for this American-English comma-placement convention.

QUESTION NO: 19

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Planet Earth's Windiest Observatory

[§1] Step outside into blowing snow, freezing fog, 45 mph winds with hurricane-force gusts, and a −50° Fahrenheit windchill. Welcome to a typical January day at the

Mount Washington Observatory. [A] Weather conditions at this facility, which sits atop its <1> namesake's 6,288-foot peak in New Hampshire, has earned <2> the location the nickname "Home of the World's Worst Weather."

[§2] [B] Though somewhat diminutive compared to other mountains, (Colorado's Pikes Peak, <3> for example, is more than twice its height), Mount Washington is the tallest peak in the Presidential Range. <4> The peak stands at the confluence of three major storm tracks, and its steep slopes force <5> rising winds to accelerate. In fact, scientists in 1934 recorded a surface wind speed (of 231 mph): <6> one of the fastest ever recorded.

[§3] In one study, researchers used a laser beam and advanced optical techniques to measure winds. The observatory also keeps detailed weather records that scientists have used to track climate trends and weather patterns. The <7> observatory has also advanced scientists' understanding of clouds, of ice physics, <8> and the atmosphere.

[§4] To conduct all this research, staff are on-site year-round. Observers, who work <9> several twelve-hour shifts over the course of a week. To change personnel in winter, though, <10> crews ascend the mountain in a vehicle, gripping <11> the snow using revolving tracks similar to those on a military tank. Observers go outside every hour to gather data, which they send to the

National Weather Service. [C]

[§5] Though isolated, the Mount Washington Observatory offers weather enthusiasts many ways to get involved. The observatory takes volunteers and accepts interns, who assist with research. The <12> bold can take part in educational trips to the summit in winter. [D] For those who are planning to make a trip to Mount Washington, <13> the observatory has a website with live video feeds of the summit.

<2>:

A. NO CHANGE

B. Hampshire, have earned

C. Hampshire has earned

D. Hampshire, earns

ANSWER: B

Explanation:

Hampshire, have earned is correct because the grammatical subject of the sentence is the plural noun phrase "Weather conditions." The verb must therefore be plural: "have earned." The intervening description "at this facility, which sits atop its namesake's 6,288-foot peak in New Hampshire," does not change the subject. In particular, "which sits atop…" is a nonessential relative clause that supplies additional information about the facility; it should be enclosed by commas, including a comma after "Hampshire." Once that parenthetical description is set off correctly, the main sentence reads clearly: "Weather conditions at this facility … have earned the location the nickname…" This construction maintains subject-verb agreement while making the sentence's structure easy to follow. ACT English questions commonly test agreement by placing descriptive phrases between a subject and its verb, so identifying the core subject before selecting the verb form is a reliable editing strategy. For further guidance on agreement between subjects and verbs, see the Purdue Online Writing Lab's subject-verb agreement overview and the ACT English practice resources.

QUESTION NO: 20

Which of the following sets of numbers contains all and only the roots of the equation f(x) = x3 + 7x2 − 8x?

A. {−8, 1}

B. {8, −1}

C. {0, −8, 1}

D. {0, 8, −1}

E. {0, −1, −8, 1, 8}

ANSWER: C

Explanation:

The set **{0, −8, 1}** contains all and only the roots of the equation. Roots are the values of *x* for which *f(x)* equals zero. Begin by factoring out the common factor *x*: $x^3 + 7x^2 - 8x = x(x^2 + 7x - 8)$. The quadratic factor then factors as $(x + 8)(x - 1)$, since multiplying these binomials produces $x^2 + 7x - 8$. Thus the expression can be written as $x(x + 8)(x - 1)$.

By the zero-product property, this product equals zero when any factor equals zero. The factor *x* gives the root 0; $x + 8$ gives the root −8; and $x - 1$ gives the root 1. Therefore, the complete root set is **{0, −8, 1}**. This is a cubic polynomial factored into three linear factors, so these three values account for every root. For review of factoring polynomial expressions and using factors to solve equations, see OpenStax: Solve Polynomial Equations by Factoring.

QUESTION NO: 21

How the Other Half Lives

(1) Long ago it was said that “one half of the world does not know how the other half lives.” That was true then. It did not know because it did not care. The half that was on top cared little for thestruggles, and less for the fate of those who were underneath, so long as it was able to hold them there and keep its own seat. There came a time when the discomfort and crowding below were so great, and the consequent upheavals so violent, that it was no longer an easy thing to do, and then the upper half fell to wondering what the matter was. Information on the subject has been accumulating rapidly since, and the whole world has had its hands full answering for its old ignorance.

(2) In New York, the youngest of the world’s great cities, that time came later than elsewhere, because the crowding had not been so great. There were those who believed that it would nevercome; but their hopes were vain. Greed and reckless selfishness delivered similar results here as in the cities of older lands. “When the great riot occurred in 1863,” reads the testimony of the Secretary of the Prison Association of New York before a legislative committee appointed to investigate causes of the increase of crime in the State twenty-five years ago, “every hiding-place and nursery of crime discovered itself by immediate and active participation in the operations of the mob. Those very places and domiciles, and all that are like them, are today nurseries of crime, and of the vices and disorderly courses which lead to crime. By far the largest part – 80% at least – of crimes against property and people are perpetrated by individuals who have either lost connection with home life, or never had any, or whose homes had ceased to afford what are regarded as ordinary wholesome influences of home and family… The younger criminals seem to come almost exclusively from the worst tenement house districts, that is, when traced back to the very laces where they had their homes in the city here.” One thing New York was made of sure at that early stage of the inquiry: the boundary line of the Other Half lies through the tenements.

(3) It is ten years and over, now, since that line divided New York’s population evenly. Today three-fourths of New Yorkers live in the tenements, and the nineteenth century drift of the populationto the cities is only increasing those numbers. The fifteen thousand tenant houses in the past generation have swelled into thirty-seven thousand, and more than twelve hundred thousand persons call them home. The one way out – rapid transit to the suburbs – has brought no relief. We know now that there is no way out; that the “system” that was the evil offspring of public neglect and private greed is here to stay, forever a center of our civilization. Nothing is left but to make the best of a bad bargain.

(4) The story is dark enough, drawn from the plain public records, to send a chill to any heart. If it shall appear that the sufferings and the sins of the “other half,” and the evil they breed, are but asa fitting punishment upon the community that gave it no other choice, it will be because that is the truth. The boundary line lies there because, while the forces for good on one side vastly outweigh the bad – not otherwise – in the tenements all the influences make for evil; because they are the hotbeds of the epidemics that carry death to rich and poor alike; the nurseries of poverty and crime that fill our jails and courts; that throw off forty thousand human wrecks to the island asylums and workhouses year by year; that turned out in the last eight years a round half million beggars to prey upon our charities; that maintain a standing army of ten thousand panhandlers with all that that implies; because, above all, they touch the family life with deadly moral poison. This is their worst crime, inseparable from the system. That we have to own it, the child of our own wrong, does not excuse it, even though it gives it claim upon our utmost patience and tenderest charity.

In the third paragraph, the statement “It is ten years and over, now, since that line divided New York’s population evenly” best means:

A. Tenements are no longer located in one area of the city.

B. The crimes of the poor affect the rich.

C. More than half of New York’s population lives in poverty.

D. The poor no longer live only in tenements.

ANSWER: C

Explanation:

“More than half of New York’s population lives in poverty.” is correct because “that line” refers directly to the preceding paragraph’s “boundary line of the Other Half,” which the author says runs through the tenements. The “Other Half” is the population living under the deprived, overcrowded, and socially harmful conditions described throughout the passage. Saying that this boundary once “divided New York’s population evenly” means that, more than ten years earlier, roughly half the city’s residents belonged to this disadvantaged tenement population. The next sentence supplies the decisive update: “Today three-fourths of New Yorkers live in the tenements.” Thus, the group on the tenement side of the boundary has grown from about one-half to three-fourths of the population. In the author’s argument, tenement life is inseparably associated with poverty, crowding, illness, and social neglect, so the best paraphrase is that more than half of New Yorkers live in poverty. This interpretation follows the passage’s immediate context and its central contrast between the secure “upper” population and the impoverished “Other Half.” The source text is available through Project Gutenberg; historical context on tenement conditions is also provided by the Tenement Museum.

QUESTION NO: 22

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Spine

[§1] Good spine health is important for every person. The human spine support the weight of the head, protects the body’s organs, and receives <1> the gravitational pull that helps with posture. Comprised of 33 bones, each called vertebra, the spine is divided into five regions: cervical, <2> thoracic, lumbar, sacral, and coccygeal. Vertebrae are named according to the region where they are located along the spine and in numerical order. Discs serve as cushions between each vertebra. Nerves run along the spine, carrying signals between the spine and the rest of the body.

[§2] There are many reasons why people experience problems with their spine. Some people like us are born <3> with defects such as spina bifida, which stunts infant <4> brain and spine development. Trauma to the spine can also create problems, in addition <5> when the damage is irreversible. Paralysis happened <6> when the spine is injured beyond repair, and may result in loss of function in the arms or legs. Another reason for damage is the body’s natural deterioration. As a person ages, the spine wears out. The discs that separate each vertebra lose moisture, and nerves that run alongside the spine can become more narrow, which <7> decreases the spines <8> ability to absorb pressure, especially when walking, jogging, or jumping.

[§3] Prevention is the best way to maintain a healthy back. There are varieties of ways that people keep themselves pain free and functioning at optimum levels. Sleeping on your back with a pillow under the knees supports its <9> natural curve during the night. When sitting at a desk, keeping ears, shoulders, and hips in line while resting the back firmly against the chair helps with posture. Standing straight with relaxed shoulders, hips, and knees will eliminate undue pressure on the spine. Walking with your head held high, chin tucked, and toes pointed forward will prevent slouching. Plus, you will look fantastically confident. <10>

[§4] Diet and sunshine are also important for back health, well-balanced <11> foods build lean muscles that support the spine. Lean proteins, fresh fruits and vegetables, and plenty <12> of water to keep the body hydrated are best choices for a daily regimen. While Vitamin D is found in many foods such as salmon and green leaf lettuce. The <13> sunshine is a body’s best source. At least ten minutes of day <14> sunlight will strengthen bones and provide energy to the body’s systems, encouraging the body to stand straighter. <15>

<14>:

A. NO CHANGE

B. day’s

C. daily

D. todays

ANSWER: C

Explanation:

The correct wording is *daily* because it is an adjective that naturally modifies the noun *sunlight*. The phrase “ten minutes of daily sunlight” means ten minutes of sunlight each day, which precisely expresses the passage’s recommendation for a regular health habit. In this sentence, the blank needs a word that describes the kind or frequency of sunlight received, and *daily* performs that grammatical role directly and idiomatically. The surrounding paragraph discusses routine practices that support spinal health, including a nutritious diet, hydration, and exposure to sunshine. Using *daily* maintains that practical, instructional tone by presenting sunlight as a consistent part of a person’s regimen. Standard English commonly uses adjectives before nouns to convey frequency, as in “daily exercise,” “daily vitamins,” or “daily sunlight.” This construction is clear, concise, and appropriate for the passage’s formal informational style. For guidance on adjective function and placement in English sentences, see the Purdue OWL explanation of adjectives. The usage is also consistent with the dictionary definition of daily as something occurring every day.

QUESTION NO: 23

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Bicycles

[§1] (1) Today, bicycles are so common that it’s hard to believe they haven’t always been around. (2) But two hundred years ago, bicycles weren’t even existing, <1> and the first bicycle, invented in Germany in 1818, was nothing like our bicycles today – it was made of wood and didn’t even have pedals. (3) Since then, however, numerous innovations and improvements in design have made the bicycle one of the most popular means of recreation and transportation around the world.

[§2] (4) In 1839, Kirkpatrick Macmillan a Scottish blacksmith, <2> dramatically improved upon the original bicycle design. (5) Macmillan’s machine had tires with iron rims to keep them from getting worn down. (6) He also used foot-operated cranks similar to pedals so his bicycle could be ridden at a quick pace. <3> (7) It hadn’t looked <4> much like a modern bicycle, though, because its back wheel was substantially larger than its front wheel. (8) In 1861, the French Michaux brothers took the evolution of the bicycle a step further by inventing an improved crank mechanism.

[§3] (9) Ten years later, James Starley, an English inventor, revolutionized bicycle design. (10) He, made <5> the front wheel many times larger than the back wheel, putting a gear on <6> the pedals to make the bicycle more efficient, and lightened the wheels by using wire spokes. (11) Although this bicycle was much lighter and less tiring to ride, it was still clumsy, extremely topheavy, and ridden mostly for entertainment.

[§4] (12) It wasn’t until 1874 that the first truly modern bicycle appeared on the scene. (13) Today their built, <7> used, and enjoyed all over the world. (14)

H. J. Lawson, invented by another Englishman, <8> the “safety bicycle” would look familiar to today’s cyclists. (15) This bicycle had equal sized wheels, which made it less prone to toppling over. (16) Lawson also attached a chain to the pedals to drive the rear wheel. (17) With these improvements, the bicycle became extremely popular and useful for transportation.

Which of the following sequences makes paragraph 4 most logical?

A. NO CHANGE

B. (12), (13), (14), (16), (17), (15)

C. (12), (17), (14), (15), (16), (13)

D. (12), (14), (15), (16), (17), (13)

E. J. Lawson, invented by another Englishman, <8> the “safety bicycle” would look familiar to today’s cyclists. (15) This bicycle had equal sized wheels, which made it less prone to toppling over. (16) Lawson also attached a chain to the pedals to drive the rear wheel. (17) With these improvements, the bicycle became extremely popular and useful for transportation. Which of the following sequences makes paragraph 4 most logical?

ANSWER: D

Explanation:

The most logical sequence is **(12), (14), (15), (16), (17), (13)**. The paragraph should first establish the historical transition by stating that the first truly modern bicycle appeared in 1874. It should then immediately identify that bicycle and its inventor: H. J. Lawson invented the “safety bicycle,” a machine recognizable to modern cyclists. This introduction gives the following sentence a clear referent for “This bicycle” and prepares the reader for the description of its equal-sized wheels. The next sentence naturally adds another design feature, the chain that drove the rear wheel. Once both improvements have been described, the statement that these improvements made the bicycle popular and useful for transportation provides an effective result of those features. Finally, the sentence about bicycles being built, used, and enjoyed worldwide works best as the paragraph’s broad concluding statement, connecting the historical development to the present day. This organization follows the ACT English emphasis on logical paragraph structure, clear pronoun reference, and purposeful transitions. See ACT’s overview of the English section at ACT English practice questions and its general test-preparation guidance at ACT test preparation.

QUESTION NO: 24

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Planet Earth’s Windiest Observatory

[§1] Step outside into blowing snow, freezing fog, 45 mph winds with hurricane-force gusts, and a −50° Fahrenheit windchill. Welcome to a typical January day at the

Mount Washington Observatory. [A] Weather conditions at this facility, which sits atop its <1> namesake’s 6,288-foot peak in New Hampshire, has earned <2> the location the nickname “Home of the World’s Worst Weather.”

[§2] [B] Though somewhat diminutive compared to other mountains, (Colorado’s Pikes Peak, <3> for example, is more than twice its height), Mount Washington is the tallest peak in the Presidential Range. <4> The peak stands at the confluence of three major storm tracks, and its steep slopes force <5> rising winds to accelerate. In fact, scientists in 1934 recorded a surface wind speed (of 231 mph): <6> one of the fastest ever recorded.

[§3] In one study, researchers used a laser beam and advanced optical techniques to measure winds. The observatory also keeps detailed weather records that scientists have used to track climate trends and weather patterns. The <7> observatory has also advanced scientists’ understanding of clouds, of ice physics, <8> and the atmosphere.

[§4] To conduct all this research, staff are on-site year-round. Observers, who work <9> several twelve-hour shifts over the course of a week. To change personnel in winter, though, <10> crews ascend the mountain in a vehicle, gripping <11> the snow using revolving tracks similar to those on a military tank. Observers go outside every hour to gather data, which they send to the

National Weather Service. [C]

[§5] Though isolated, the Mount Washington Observatory offers weather enthusiasts many ways to get involved. The observatory takes volunteers and accepts interns, who assist with research. The <12> bold can take part in educational trips to the summit in winter. [D] For those who are planning to make a trip to Mount Washington, <13> the observatory has a website with live video feeds of the summit.

<12>:

A. NO CHANGE

B. research and the

C. research but the

D. research, the

ANSWER: A

Explanation:

“NO CHANGE” is correct because *the bold* uses an adjective as a nominal adjective: the adjective *bold*, preceded by *the*, stands for the group of people who are bold enough to participate in demanding winter trips to Mount Washington’s summit. English commonly uses this construction to refer collectively to people defined by a quality, as in “the brave,” “the young,” or “the elderly.” The wording is concise, idiomatic, and particularly effective in this passage because it matches the adventurous tone established by descriptions of severe weather, winter travel, and research at the observatory. It also gives the sentence a lively, slightly playful emphasis while clearly conveying that participation is intended for especially daring visitors. Standard grammar references recognize that adjectives can function substantively after *the* to denote a class of people. The construction does not require an added noun when the context makes the intended group clear, as it does here. See the discussion of adjective usage in Cambridge Dictionary Grammar and the entry on substantivized adjectives in Britannica Dictionary.

QUESTION NO: 25

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Mystery Paper Sculptor

[§1] Between March and November of 2011, an anonymous donor left intricately <1> crafted paper sculptures at various cultural institutions in Edinburgh, Scotland. Delighted, each sculpture was left secretly and was later discovered by staff. <2> The delicate sculptures – streetscapes, plants, and animals – were carved exclusively from the pages and bindings of books. The tiny details in the pieces are awe-inspiring.

[§2] The first sculpture discovered – at the Scottish Poetry Library – was a tiny tree formed from a book of verse. Library staff dubbed <3> it the “poetree.” The tree sits atop a book. Beneath the tree are the halves of a golden paper egg, each half filled with words clipped from the poem “A Trace of Wings” by Edwin Morgan. At Edinburgh's Filmhouse Cinema, a three-dimensional sculpted scene <4> shows patrons sitting in a movie theater as horse leaps <5> out of the screen. At the Scottish Storytelling Centre, a dragon crafted from the pages <6> of a mystery novel was found nesting in a window. At the National Museum of Scotland, a paper tail was spotted emerging from the spine of Sir Arthur Conan Doyle’s book The Lost World. Inside, a dinosaur charges through shredded pages of the open book. More creations appeared at more than a few additional places where literature and artifacts are related to <7> books and writing. Therefore, <8> a total of ten sculptures were bestowed on special institutions, whose staff are thrilled by their luck.

[§3] The creator of these sculptures are <9> not known because no one has claimed responsibility. So far, that is. The last gift came with a note in which the mystery artist reveals her gender. Whatever: whoever <10> created the art, your <11> intention is clear. Each gift came with a note expressing special gratitude <12> for “libraries, books, words, ideas.” <13>

[§4] Ironically, the creator of these exquisite sculptures who destroyed books <14> – cutting them up with <15> refashioning them into elaborate works of art – as “a tiny gesture in support of the special places.” The mystery artist celebrated the magic of those places and, at the same time, made some magic.

<14>:

A. NO CHANGE

B. for whom books were destroyed –

C. as she destroyed books –

D. destroyed books –

ANSWER: D

Explanation:

“destroyed books –” is correct because it supplies the main verb that the sentence needs: the subject is “the creator of these exquisite sculptures,” and “destroyed” states what that creator did. The phrase between the dashes then functions as supplementary information describing the method of destruction and transformation: cutting up books and refashioning them into artworks. This construction preserves the intended irony: an artist who values libraries, books, words, and ideas

nevertheless uses books as the material for sculptures. The later phrase “as ‘a tiny gesture in support of the special places’” explains the artist’s purpose in making the works. In contrast, retaining “who destroyed books” would make the wording before the dash a descriptive relative clause rather than the sentence’s central action, leaving the sentence without a complete main clause. Standard written English requires an independent clause with a subject and finite verb. Here, “the creator ... destroyed books” forms that complete clause, while the dash-enclosed wording adds a nonessential elaboration. For guidance on independent clauses and effective use of dashes, see the Purdue OWL discussion of dashes and the Purdue OWL overview of independent and dependent clauses.

QUESTION NO: 26

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Sigmund Freud

[§1] The father and originator of <1> psychoanalysis, Sigmund Freud (1856–1939) is largely responsible for the way we understand ourselves, as creatures, with <2> conflicting “selves” and desires. Freud posited the notion that the mind is teeming with “psychic energy,” and that our personality is shaped largely by the interactions of the levels of the mind. Among Freud’s most important contributions to modern psychology and the contemporary understanding of the self is his theory of the unconscious.

[§2] (1) According to Freud, the mind is much like an iceberg. (2) Most of our mind’s activities, then, occur beneath the surface, in the unconscious and beyond our knowing. (3) The conscious is the part of the mind of which we are aware; it is the tip of the iceberg that is visible above the water. (4) The unconscious, on the other hand, <3> is all that is below the surface – the thoughts, feelings, and desires that we are not aware of but that nonetheless affect our behavior.

[§3] Freud believed that the unconscious is deterministic. That is, our behaviors are caused (determined) by thoughts and impulses deep in our unconscious – of which thoughts and impulses we are not aware. <4> This is related to the phenomenon called “Freudian slip”. <5> Unless we psychoanalyze ourselves, we may never be aware of the hidden reasons for our actions. This suggests that the notion of free will might have been <6>an illusion and that our choices are governed by hidden mental processes over which we have no control.

[§4] Repression is the act of pushing our conflicts to the unconscious. So that <7> we are no longer aware of them. It is our chief defense mechanism (a way to avoid conflict between our true desires and our sense of right and wrong). Freud believed that too much repression can lead to neurosis, a mental disorder resulting in depression or abnormal behavior, sometimes with physical symptoms but with no evidence of disease.

<1>:

A. NO CHANGE

B. father (and originator) of

C. father, and originator of,

D. father of

ANSWER: D

Explanation:

“father of” is the best revision because it expresses the intended meaning clearly, idiomatically, and economically: Freud is being identified as the principal founder of psychoanalysis. In this context, “father” already conveys the idea of an originator or founding figure, so the phrase provides all the information the sentence needs without repeating the same idea. The resulting sentence—“The father of psychoanalysis, Sigmund Freud (1856–1939) is largely responsible …”—has a direct appositive structure: the descriptive phrase identifies Freud, and the main clause then states his influence. This concise phrasing also fits the passage’s informative, textbook-like tone and keeps the emphasis on Freud’s role in shaping modern understandings of the mind. ACT English questions assess writers’ ability to make choices that are grammatically sound, precise, and effective for the passage’s purpose and style. Choosing the clearest wording without unnecessary repetition follows that emphasis on effective language use. See ACT’s overview of the English test at ACT: Description of the ACT and its guidance on English conventions at ACT English Test Preparation.

QUESTION NO: 27

Leonardo Da Vinci

(1) On the sunny slopes of Monte Albano, between Florence and Pisa, the little town of Vinci lay high among the rocks that crowned the steep hillside. Here in the year 1452 Leonardo, son ofSer Piero da Vinci, was born. It was in the age when people told fortunes by the stars, and when a baby was born they would eagerly look up and decide whether it was a lucky or unlucky star which shone upon the child. Surely if it had been possible in this way to tell what fortune waited the little Leonardo, a strange new star must have shone that night, brighter than the others and unlike the rest in the dazzling light of its strength and beauty.

(2) Leonardo was always a strange child. Even his beauty was not like that of other children. He had the most wonderful waving hair, falling in regular ripples, like the waters of a fountain, thecolor of bright gold, and soft as spun silk. His eyes were blue and clear, with a mysterious light in them, not the warm light of a sunny sky, but rather the blue that glints in the iceberg. They were merry eyes too, when he laughed, but underneath was always that strange cold look. There was a charm about his smile which no one could resist, and he was a favorite with all. Yet people shook their heads sometimes as they looked at him, and they talked in whispers of the old witch who had lent her goat to nourish the little Leonardo when he was a baby. The woman was a dealer in black magic, and who knew but that the child might be a changeling?

(3) It was the old grandmother, Mona Lena, who brought Leonardo up and spoilt him not a little. His father, Ser Piero, was a lawyer, and spent most of his time in Florence, but when he returnedto the old castle of Vinci, he began to give Leonardo lessons and tried to find out what the boy was fit for. But Leonardo hated those lessons and would not learn, so when he was seven years old he was sent to school.

(4) This did not answer any better. The rough play of the boys was not to his liking. When he saw them drag the wings off butterflies, or torture any animal that fell into their hands, his face grewwhite with pain, and he would take no share in their games. The Latin grammar, too, was a terrible task, while the many things he longed to know no one taught him.

(5) So it happened that many a time, instead of going to school, he would slip away and escape up into the hills, as happy as a little wild goat. Here was all the sweet fresh air of heaven, insteadof the stuffy school room. Here were no cruel, clumsy boys, but all the wild creatures that he loved. Here he could learn the real things his heart was hungry to know, not merely words which meant nothing and led to nowhere.

(6) For hours he would lie perfectly still with his heels in the air and his chin resting in his hands, as he watched a spider weaving its web, breathless with interest to see how the delicate threadswere turned in and out. The gaily painted butterflies, the fat buzzing bees, the little sharp-tongued green lizards, he loved to watch them all, but above everything he loved the birds. Oh, if only he too had wings to dart like the swallows, and swoop and sail and dart again! What was the secret power in their wings? Surely by watching he might learn it. Sometimes it seemed as if his heart would burst with the longing to learn that secret. It was always the hidden reason of things that he desired to know. Much as he loved the flowers he must pull their petals off, one by one, to see how each was joined, to wonder at the dusty pollen, and touch the honey-covered stamens. Then when the sun began to sink he would turn sadly homewards, very hungry, with torn clothes and tired feet, but with a store of sunshine in his heart.

(7) His grandmother shook her head when Leonardo appeared after one of his days of wandering.

(8) ‘I know thou should be whipped for playing truant,’ she said; ‘and I should also punish thee for tearing thy clothes.’

(9) ‘Ah! But thou wilt not whip me,’ answered Leonardo, smiling at her with his curious quiet smile, for he had full confidence in her love.

(10) ‘Well, I love to see thee happy, and I will not punish thee this time,’ said his grandmother; ‘but if these tales reach thy father’s ears, he will not be as tender as I am towards thee.’

(11) And, sure enough, the very next time that a complaint was made from the school, his father happened to be at home, and then the storm burst.

(12) ‘Next time I will flog thee,’ said Ser Piero sternly, with rising anger at the careless air of the boy. ‘Meanwhile we will see what a little imprisonment will do towards making thee a better child’.

(13) Then he took the boy by the shoulders and led him to a little dark cupboard under the stairs, and there shut him up for three whole days.

(14) There was no kicking or beating at the locked door. Leonardo sat quietly there in the dark, thinking his own thoughts, and wondering why there seemed so little justice in the world. But sooneven that wonder passed away, and as usual when he was alone he began to dream dreams of the time when he should have learned the swallows’ secrets and should have wings like theirs.

(15) But if there were complaints about Leonardo's dislike of the boys and the Latin grammar, there would be none about the lessons he chose to learn. Indeed, some of the masters began todread the boy's eager questions, which were sometimes more than they could answer. Scarcely had he begun the study of arithmetic than he made such rapid progress, and wanted to puzzle out so many problems, that the masters were amazed. His mind seemed always eagerly asking for more light, and was never satisfied.

It can be inferred from the passage that Leonardo:

I. did not mind being alone.

II. was fascinated by flight.

III. was popular with the other students.

A. I and II only

B. I, II, and III

C. I only

D. II only

E. did not mind being alone.
II. was fascinated by flight.
III. was popular with the other students.

ANSWER: A

Explanation:

I and II only is correct because both conclusions are supported by specific details in the passage. Leonardo repeatedly seeks solitude in the hills, where he spends long periods quietly observing insects, animals, flowers, and birds. When his father confines him in a dark cupboard for three days, he does not protest; instead, he sits quietly, thinks, and begins dreaming. These details reasonably support the inference that he was comfortable being by himself and absorbed in his inner thoughts and observations.

The passage also strongly establishes his fascination with flight. Birds are identified as the creatures he loves "above everything," and he longs to have wings so that he can move like swallows. His questions about the "secret power" in their wings show that his interest is not merely casual admiration. He wants to understand the mechanism that enables flight, matching the passage's broader portrayal of his desire to discover the hidden reasons behind natural phenomena.

This question requires drawing conclusions from textual evidence rather than locating an identical sentence in the selection, an approach emphasized in ACT English and reading preparation materials. See the ACT's official test-description page and its official test-preparation resources.

QUESTION NO: 28

Which of the following is the set of positive factors of 12 that are NOT multiples of 2?

A. {2, 4, 6, 12}

B. {1}

C. {1, 3}

D. {1, 2, 3}

ANSWER: C

Explanation:

The correct set is **{1, 3}**. Positive factors are whole numbers greater than zero that divide a number evenly, with no remainder. To identify the positive factors of 12, use its factor pairs: 1 × 12, 2 × 6, and 3 × 4. These pairs give the complete set of positive factors: 1, 2, 3, 4, 6, and 12.

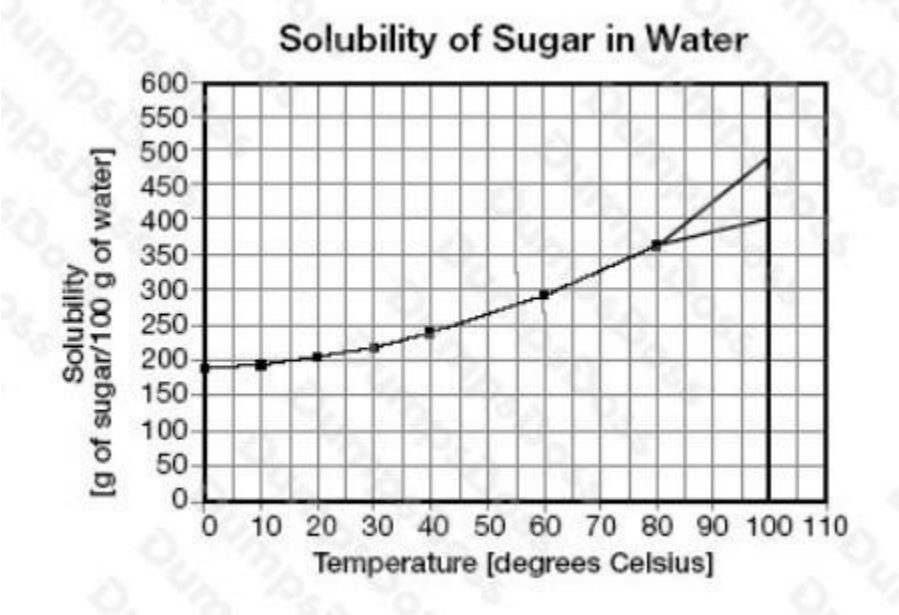
A multiple of 2 is any number that can be written as 2 times an integer; equivalently, it is an even integer. Among the factors of 12, 2, 4, 6, and 12 are multiples of 2. Removing those values leaves 1 and 3. Both values divide 12 evenly, and neither is divisible by 2, so the requested set is {1, 3}.

This solution applies the definitions of factors and multiples directly and ensures that every listed value meets both conditions: it must be a positive factor of 12 and must not be a multiple of 2. For additional review of factors, multiples, and divisibility, see Khan Academy: Factors and multiples and OpenStax Prealgebra: Factors and Multiples.

QUESTION NO: 29

A mixture that is made by dissolving one compound (solute) in another (solvent) is called a solution. The amount of solute that can be dissolved in a solvent at a given temperature is called solubility. For most substances, solubility increases with temperature. When the amount of solute dissolved in a solvent exceeds the solubility, the solution is called supersaturated. Rock candy can be made by dissolving as much sugar in water, as solubility would allow at a high temperature, and then slowly cooling the solution to room temperature. If a thin string is dipped into it and left in the solution, the sugar in excess of the solubility at room temperature will form sugar crystals around the string, making the sweet rock candy. The solubility (in grams of sugar per

100 grams of water) as a function of temperature (in degrees Celsius) is plotted in the graph below.



Solubility is defined as:

A. a supersaturated mixture.

B. a mixture that is made by dissolving a solute in a solution.

C. the amount of solute that can be dissolved in a solvent at a given temperature.

D. the temperature that causes super saturation.

ANSWER: C

Explanation:

“the amount of solute that can be dissolved in a solvent at a given temperature” is correct because it states the standard scientific definition of solubility and exactly matches the definition supplied in the passage. A solute is the substance being dissolved, such as sugar in the rock-candy example, while the solvent is the substance doing the dissolving, such as water. Solubility measures the maximum amount of that solute that can remain dissolved in a specified amount of solvent under

stated conditions, especially temperature. Thus, a solubility graph can show how many grams of sugar dissolve in 100 grams of water at each temperature. At higher temperatures, water can generally dissolve more sugar; when a hot, saturated sugar solution cools, it can contain more dissolved sugar than is normally stable at the cooler temperature. The excess sugar can then crystallize on the string. This application illustrates why a temperature-specific limit is essential to the meaning of solubility. The definition is consistent with the terminology used by the IUPAC Gold Book and the overview of solutions and solubility provided by Encyclopaedia Britannica.

QUESTION NO: 30

DIRECTIONS: In the passage below, certain phrases are underlined and numbered. The question will present alternatives for the underlined part. In most cases, choose the alternative that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.”

Community Gardens

[§1] On an empty lot beside the library, volunteers created a community garden. For years, the lot had collected litter and weeds and had gone unused by neighborhood residents. Now, raised beds hold tomatoes, herbs, and flowers.

[§2] The garden’s organizers, who meet every Saturday morning, they assign tasks to volunteers. Some volunteers water seedlings, while others build trellises for climbing beans.

2. Which choice best replaces the underlined portion?

A. NO CHANGE

B. The garden’s organizers, who meet every Saturday morning, assign tasks to volunteers.

C. The garden’s organizers who meet every Saturday morning, they assign tasks to volunteers.

D. The garden’s organizers, meeting every Saturday morning, and assign tasks to volunteers.

ANSWER: B

Explanation:

The garden’s organizers, who meet every Saturday morning, assign tasks to volunteers. is correct because the subject is *organizers*, and *assign* is its verb. The nonessential clause *who meet every Saturday morning* is correctly set off by commas.

Adding *they* creates an unnecessary and ungrammatical repetition of the subject. The revision is concise and maintains the passage’s informative tone.

QUESTION NO: 31

When x = 4 and y = 5, by how much does the value of 3x2 − 2y exceed the value of 2x2 − 3y?

A. 3

B. 7

C. 21

D. 28

ANSWER: C

Explanation:

The correct answer is **21**. Here, the notation “x2” is understood as x squared, or x^2. Since x = 4, first calculate x^2: $4^2 = 16$. The first expression is $3x^2 - 2y$, so its value is $3(16) - 2(5) = 48 - 10 = 38$. The second expression is $2x^2 - 3y$, so its value is $2(16) - 3(5) = 32 - 15 = 17$. The wording “by how much does ... exceed” asks for the amount by which the first value is greater than the second, requiring subtraction: $38 - 17 = 21$. Equivalently, subtracting the expressions before substituting gives $(3x^2 - 2y) - (2x^2 - 3y) = x^2 + y$. Substituting the given values produces 16 + 5, which is 21. This use of substitution, exponent evaluation, and expression comparison reflects the algebra skills assessed in ACT Mathematics. See the ACT Math practice resources and the official ACT test overview.

QUESTION NO: 32

A teacher provided the table below to the students in a science class. The table gives 5 properties for each of Sample A-H. The students were told to assume that each sample is a completely solid cube composed of a single hypothetical pure substance.

Sample	Mass (g)	Volume (cm^3)	Density (g/cm^3)	Melting point (°C)	Boiling point (°C)
A	8.0	4.0	2.0	126	747
B	8.0	4.0	2.0	342	959
C	6.0	3.0	2.0	237	885
D	6.0	3.0	2.0	237	885
E	8.0	2.0	4.0	126	747
F	8.0	2.0	4.0	126	747
G	4.0	1.0	4.0	126	747
H	4.0	1.0	4.0	342	959

Note: Assume that mass, volume, and density were determined at 20°C and that all 5 properties were determined at 1 atmosphere (atm) of pressure.

The teacher asked each of 4 students to explain how these data could be used to predict which samples are composed of the same substance.

Student 1

If 2 samples have the same values for all 5 properties, they are composed of the same substance. If 2 samples have different values for any of the 5 properties, they are composed of different substances.

Student 2

If 2 samples have the same values for any 3 or more of the 5 properties, they are composed of the same substance. If 2 samples have the same values for fewer than 3 of the 5 properties, they are composed of different substances.

Student 3

If 2 samples have the same mass, volume, and density, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither melting point nor boiling point, by itself, can distinguish between substances.

Student 4

If 2 samples have the same density, melting point, and boiling point, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither mass nor volume, by itself, can distinguish between substances.

Consider the statement “Two samples that have the same mass, volume, density, and boiling point are composed of the same substance, even if the two samples have different melting points.” Which of Students 2 and 4, if either, would be likely to agree with this statement?

A. Student 2 only

B. Student 4 only

C. Both Student 2 and Student 4

D. Neither Student 2 nor Student 4

ANSWER: A

Explanation:

Student 2 only is correct because the stated pair of samples matches on four of the five listed properties: mass, volume, density, and boiling point. Under Student 2’s proposed rule, two samples are predicted to be the same substance whenever they share the same values for any three or more properties. Four matching properties satisfies that threshold, so Student 2 would agree that the samples are composed of the same substance despite their differing melting points.

This question asks students to apply each person’s explicitly stated classification rule, rather than independently determine the scientifically best way to identify a pure substance. In physical science, density, melting point, and boiling point are generally treated as characteristic intensive properties, whereas mass and volume depend on the amount of material present. The important reasoning here, however, is that Student 2 counts the number of matching entries without assigning special importance to a particular property. Since the samples agree on more than three properties, the conclusion follows directly from that rule. For background on intensive properties and characteristic physical properties, see OpenStax Chemistry 2e and Encyclopaedia Britannica.

QUESTION NO: 33

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Beloved and The Oprah Effect

[§1] In 1998, the movie adaptation of author Toni Morrison’s novel Beloved was released, directed by Jonathan Demme and co-produced by Oprah Winfrey, whom had spent 10 years bringing it to the screen. <1> Winfrey also stars as the main character, Sethe, alongside Danny Glover as Sethe’s lover, Paul D, and Thandie Newton as Beloved. <2>

[§2] The movie flopped at the box office. <3> A review in the Economist suggested that “most audiences are not eager to endure nearly three hours of a cerebral film with an original storyline featuring supernatural themes, murder, rape and slavery.” Film critic Janet Maslin, however, in her review, “No Peace from a Brutal Legacy,” <4> called it a “transfixing, deeply felt adaptation of Toni Morrison’s novel. …Its linchpin is of course Oprah Winfrey, who had the clout and foresight to bring ‘Beloved’ to the screen and has the dramatic presence to hold it together.

[§3] In 1996, television talk show host <5> Winfrey had selected Song of Solomon for her newly launched Book Club, which became a popular feature on her Oprah Winfrey Show. An average of 13 million viewers watched the show’s Book Club segments. As a result, <6> when Winfrey selected Morrison’s earliest novel, The Bluest Eye in 2000, <7> it sold another 800,000 paperback copies. John Young wrote in the African American Review in 2001 that Morrison's career experienced the boost of the “Oprah Effect, …enabling Morrison to reach a broad, popular audience.” Winfrey selected a total of four of Morrison’s novels over six years, giving Morrison’s novels a bigger sales boost than they got from her Nobel Prize win in 1993. <8> The novelist also appeared three times on Winfrey’s show. Winfrey said, “For all those who asked the question ‘Toni Morrison again?’…I say with certainty there would have been no Oprah’s Book Club if this woman had not chosen to share her love of words with the world.” <9> Morrison called the Book Club “a reading revolution.” <10>

<9>:

A. NO CHANGE

B. “For all those who asked the question, ‘Toni Morrison again?’…I say with certainty ‘there would have been no Oprah’s Book Club if this woman had not chosen to share her love of words with the world.’”

C. “For all those who asked, the question ‘Toni Morrison again?’…I say with certainty there would have been no Oprah’s Book Club if this woman had not chosen to share her love of words with the world.”

D. “For all those who asked the question, ‘Toni Morrison again?’…I say with certainty there would have been no Oprah’s Book Club if this woman had not chosen to share her love of words with the world.”

ANSWER: D

Explanation:

The version reading “For all those who asked the question, ‘Toni Morrison again?’…I say with certainty there would have been no Oprah’s Book Club if this woman had not chosen to share her love of words with the world.” correctly handles a quotation within Oprah Winfrey’s larger direct quotation. The comma after *question* properly introduces the exact words that hypothetical readers or viewers might have asked: ‘Toni Morrison again?’ Because those words are a quotation embedded within another quotation, single quotation marks distinguish the inner quoted question from the outer quotation attributed to Winfrey. The question mark remains inside the single quotation marks because it belongs to the quoted question itself. The remainder of Winfrey’s statement—beginning “I say with certainty”—continues as her own direct statement within the outer quotation marks. It is not presented as a separate quoted utterance, so it should not receive single quotation marks. This punctuation makes the relationship among Winfrey’s statement, the audience’s implied question, and the rest of her response immediately clear. Guidance on commas introducing quotations and punctuation with quotation marks appears in Purdue OWL’s quotation-mark guidance and Merriam-Webster’s quotation-mark rules.

QUESTION NO: 34

The product of $(\frac{a}{b})^2 \times (\frac{b}{a})^{-2} \times (\frac{1}{a})^{-1} =$ is

A. a

B. 1/a

C. a^3/b^4

D. a^4/b^4

E. a^5/b^4

ANSWER: E

Explanation:

The product simplifies to **a^5/b^4**. When multiplying expressions with like bases, add the exponents on each base. The powers of *a* therefore combine to give an exponent of 5. For the factor involving *b*, the negative exponent indicates a reciprocal: a factor such as b^{-n} is equivalent to $1/b^n$. Rewriting that factor with a positive exponent places b^4 in the denominator. Thus the product is written in standard simplified form with positive exponents as a^5/b^4. This uses the product-of-powers rule, $x^m x^n = x^{m+n}$, together with the negative-exponent rule, $x^{-n} = 1/x^n$. These exponent properties are summarized in OpenStax Elementary Algebra and in Khan Academy’s negative-exponent review.

QUESTION NO: 35

An empty crate weighs 8.16 kg and an orange weighs 220 g. If Jon can lift 11,000 g, how many oranges can he pack in the crate before lifting it onto his truck?

A. 12

B. 13

C. 37

D. 46

E. 50

ANSWER: A

Explanation:

12 is correct because the crate's weight must be included in the total amount Jon lifts. First, express both weights in grams: 8.16 kilograms equals 8,160 grams, since one kilogram is 1,000 grams. This conversion follows the metric relationship documented by the National Institute of Standards and Technology. Jon's maximum lifting capacity is 11,000 grams, so after accounting for the empty crate, the remaining allowable weight for oranges is 11,000 − 8,160 = 2,840 grams. Each orange weighs 220 grams. Dividing the available 2,840 grams by 220 grams per orange gives approximately 12.91 oranges. Because oranges are whole objects and packing another orange would exceed the maximum lifting weight, only the greatest whole-number result can be used. Twelve oranges weigh 2,640 grams, and the crate plus those oranges weighs 10,800 grams, which Jon can lift. The calculation uses consistent mass units throughout, an essential practice for ACT-style quantitative word problems; see ACT's general preparation resources at ACT Test Preparation.

QUESTION NO: 36

Why Has Single Motherhood Increased?

(1) Changes in children's living arrangements result from long-standing trends in marriage, divorce, and fertility. Divorce rates in the United States have been going up since the turn of thecentury and have recently stabilized at very high levels. Out-of-wedlock birth rates have been going up gradually since at least the early 1940s. After 1960, the age of women at their first marriages began to rise, increasing the proportion of young women who might become unwed mothers. Together, these forces have fueled the growth of single parenthood during the postwar period.

(2) These trends exist in all western, industrialized countries. Divorce rates more than doubled in most countries between 1960 and 1990; in some they increased fourfold. Single parenthood alsoincreased in nearly all western countries between 1970 and the late 1980s. Yet the U.S. has the highest prevalence of single-parent families, and it has experienced the largest increase between 1970 and 1990.

(3) In the view of conservatives, welfare benefits in the United States have reduced the costs of single motherhood and discouraged young men and women from marrying. In some parts of thecountry, welfare may provide poor women with more economic security than marriage does. However, for three reasons, the argument that welfare caused the growth in single-parent families does not withstand scrutiny.

(4) The trend in welfare benefits between 1960 and 1990 does not match the trend in single motherhood. Welfare and single motherhood both increased dramatically during the 1960s and early1970s. After 1974, however, welfare benefits declined, but single motherhood continued to rise. The real value of the welfare benefit package (cash assistance plus food stamps) for a family of four with no other income fell from $10,133 in 1972 to $8,374 in 1980 and to $7,657 in 1992, a loss of 26 percent between 1972 and 1992 (in 1992 dollars).

(5) Increases in welfare cannot explain why single motherhood grew among more advantaged women. Since 1960, divorce and single parenthood have grown among women with a collegeeducation, who are not likely to be motivated by the promise of a welfare check.

(6) Welfare payments cannot explain why single motherhood is more common in the United States than in other industrialized countries. Nearly all the Western European countries have muchmore generous payments for single mothers than the U.S., yet the prevalence of single motherhood is lower in these countries. One way to compare the "costs" of single motherhood in different countries is to compare the poverty rates of single mothers with those of married mothers. While single mothers have higher poverty rates than married mothers in all industrialized countries, they are worst off in the United States.

(7) If welfare is not to blame, what is? Three factors seem to be primarily responsible.

(8) The first is the growing economic independence of women. Women who can support themselves outside marriage can be picky about when and whom they marry. They can leave badmarriages and they can afford to bear and raise children on their own. Thus, single mothers will be more common in a society where women are more economically independent, all else being equal.

(9) American women have moved steadily toward economic independence throughout this century thanks to increased hourly wages, greater control over child-bearing, and technologicaladvances that reduce time required for housework. Since the turn of the century, each new generation of young women has entered the labor force in greater proportions and stayed at work longer. By 1970, over half of all American women were employed or looking for work; by 1990, nearly three quarters were doing so. The rise in welfare benefits during the 1950s and 1960s may have made poor women less dependent on men by providing them with an alternative source of economic support. However, welfare was only a small part of a much larger change that was enabling all women, rich and poor alike, to live more easily without a husband.

(10) A second factor in the growth of single motherhood is the decline in men's earning power relative to women's. After World War II and up through the early 1970s, both men and womenbenefitted from a strong economy. While women were becoming more self-sufficient during the 1950s and 1960s, men's wages and employment opportunities were increasing as well.

Consequently, while more women could afford to live alone, the economic payoff from marriage continued to rise. After 1970, however, the gender gap in earnings (women's earnings divided by men's earnings) began to narrow. In 1970, female workers earned 59 percent as much as male workers; by 1980, they earned 65 percent as much and by 1990 74 percent. (These numbers, which come from a study by Suzanne Bianchi to be published by the Russell Sage Foundation, are based on full-time workers between the ages of 25 and 34.) In just two short decades, the economic payoff from marriage had declined by 15 percentage points. Such reductions are likely to increase single motherhood.

(11) The narrowing of the wage gap occurred among adults from all social strata, but the source of the narrowing varied. Among those with a college education, men were doing well, but womenwere doing even better. Between 1980 and 1990, the earnings of college-educated women grew by 17 percent, while the earnings of college-educated men grew by only 5 percent. (Again, I am referring to full-time workers, aged 25 to 34). Thus, even though the benefits of marriage were declining, women still had much to gain from pooling resources with a man.

How does the author determine "the gender gap" between women's and men's earnings?

A. By subtracting women's earnings from men's earnings.

B. By multiplying women's earnings times men's earnings.

C. By dividing men's earnings by women's earnings.

D. By dividing women's earnings by men's earnings.

ANSWER: D

Explanation:

The correct answer is **"By dividing women's earnings by men's earnings."** The passage explicitly defines the gender gap in earnings as "women's earnings divided by men's earnings." This definition establishes a ratio: women's earnings are the numerator, and men's earnings are the denominator. The author then illustrates that calculation using percentages: in 1970, women earned 59 percent as much as men; in 1980, they earned 65 percent; and in 1990, they earned 74 percent. Each percentage represents women's earnings expressed as a share of men's earnings for the specified group of full-time workers aged 25 to 34.

For example, if women earned $59,000 while men earned $100,000, dividing $59,000 by $100,000 produces 0.59, or 59 percent. As that ratio rises from 59 percent to 74 percent, women's earnings move closer to men's earnings, so the gap narrows in the author's usage. This is a reading-comprehension question that requires locating and applying the passage's stated definition, rather than inferring a different mathematical measure of difference. ACT Reading questions assess careful use of textual evidence; see ACT's Preparing for the ACT guide and the ACT test description.

QUESTION NO: 37

Determine whether the underlined portion of the sentence below is correct or whether it needs to be revised.

Jewelry is an accessory used by members of all classes including watches, necklaces and earrings.

A. Jewelry is an accessory used by members of all classes including watches, necklaces and earrings.

B. Jewelry, including watches, necklaces and earrings, is an accessory used by members of all classes.

C. Jewelry, including watches, necklaces and earrings, are an accessory used by members of all classes.

D. Jewelry is accessorized by members of all classes including watches, necklaces and earrings.

E. Jewelry is an accessory used by members of all classes which includes watches, necklaces and wearing earrings.

ANSWER: B

Explanation:

“Jewelry, including watches, necklaces and earrings, is an accessory used by members of all classes.” is correct because the phrase “including watches, necklaces and earrings” is placed immediately after “Jewelry,” the noun it is intended to describe. This placement makes the relationship clear: the listed items are examples of jewelry or personal accessories within the category being discussed. Commas appropriately set off this nonessential, supplementary phrase, so the central statement remains easy to follow: “Jewelry is an accessory used by members of all classes.”

The verb “is” also agrees with the grammatical subject, “Jewelry.” In this sentence, “jewelry” functions as a singular mass noun, referring to the category collectively rather than to individually countable pieces. Consequently, it takes a singular verb. Clear modifier placement and subject–verb agreement are core conventions assessed in ACT English revision questions. The ACT’s English section specifically evaluates a writer’s ability to produce clear, cohesive prose and make precise choices in sentence structure and conventions. See the ACT Preparing for the ACT guide and Purdue OWL’s guidance on comma use with introductory and interrupting elements.

QUESTION NO: 38

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Batman

[§1] Pow! Bam! Zap! Batman triumphs again, foiling evil-doers like the Joker, Penguin, and Catwoman to save the citizens of Gotham City. This superhero created in 1939 and known worldwide, continues <1> to be one of the most popular comic strip characters ever created.

[§2] Batman was the brainchild of comic book artist Bob Kane. Who was <2> just 22 years old when he was asked to create a new superhero for DC Comics. Superman was a phenomenal success, and DC Comics wanted another hero, just as powerful, to appeal to its readers. Kane’s idea for Batman reportedly came from Leonardo da Vinci’s famous sketch of a man flying with bat-like wings <3> and the masked heroes of the Shadow and Zorro series.

[§3] Kane’s Batman was a big success <4> right from the start. The masked hero soon moved from comic books to its own newspaper strip, and in 1943, Batman episodes were aired on the radio. In 1966, live-action Batman shows hit the TV screen, giving ABC network the ratings boost it badly needed. The series was wildly popular, and the syndicated show still airs today on channels such as the Cartoon Network and Nickelodeon.

[§4] Why was Batman so popular? The answer may lie in the background Kane gave his character. Batman is really Bruce Wayne, a millionaire who witnessed the murder of his parents as a child. He vowed to avenge their deaths and the bringing of criminals <5> to justice. He didn’t have any supernatural powers. Instead, he devotes <6> his life to training his body and mind to fight crime and used his wealth to develop high-tech tools and weapons, like his famous Batmobile, to aid him in his quest. Thus <7> Kane created a superhero who is just as human as the rest of us, one who <8> suffered and has dedicated himself to righting wrongs. In Batman, Kane gave us an image of our own superhero potential.

<4>:

A. NO CHANGE

B. was a really successful character whom everyone liked a lot

C. was liked a lot by a lot of people

D. was an overwhelming success

ANSWER: D

Explanation:

"was an overwhelming success" is the best revision because it states the degree of Batman's early popularity precisely, economically, and in language suited to the informative tone of the passage. The surrounding paragraph traces Batman's rapid expansion from comic books into a newspaper strip, radio episodes, and later television, so "overwhelming success" effectively prepares readers for those substantial developments. It also forms a natural, idiomatic phrase in standard written English: "success" is appropriately modified by "overwhelming" to convey an exceptionally strong public response. The sentence remains direct and focused on Kane's creation, without adding vague or conversational wording. ACT English questions reward revisions that improve diction, concision, and consistency with the passage's purpose while preserving the intended meaning. Here, the revised wording keeps the original claim—that Batman succeeded immediately—but expresses it with stronger, more specific emphasis. This aligns with ACT's guidance that effective writing should make ideas clear and choose language appropriate to the rhetorical situation. See the ACT test description and ACT's Preparing for the ACT guide.

QUESTION NO: 39

You set up an experiment to investigate the different rates at which soil and water heat and cool. You use the following equipment:

- Thermometers (measuring in °C)
- Container of soil
- Container of water
- Radiation Lamp ▪ Timer

You obtain the temperature of the soil and water over a period of time and collect the following data:

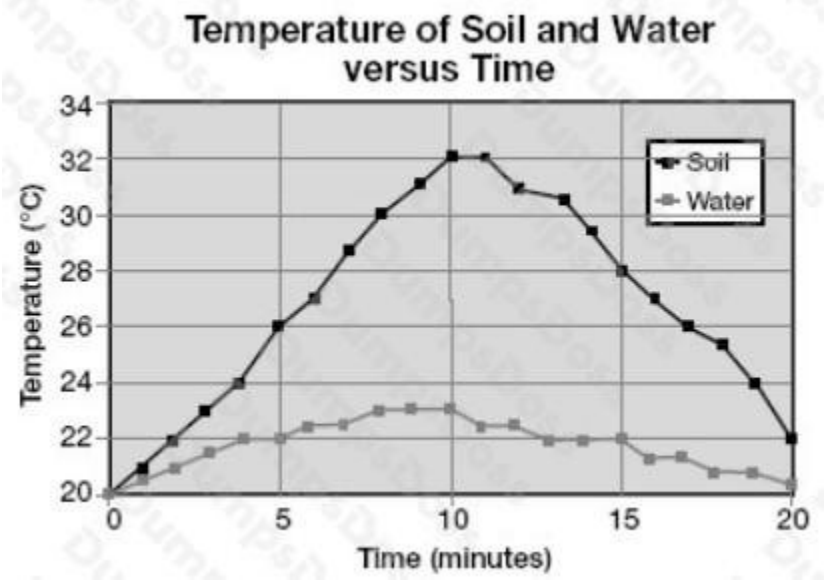
DATA TABLE I: During Heating-up Period

TIME (MIN)	SOIL TEMPERATURE (°C)	WATER TEMPERATURE (°C)
0	20.0	20.0
1	21.0	20.5
2	22.0	21.0
3	23.0	21.5
4	24.0	22.0
5	26.0	22.0
6	27.0	22.5
7	28.5	22.5
8	30.0	23.0
9	31.0	23.0
10	32.0	23.0

DATA TABLE II: During Cooling-off Period

TIME (MIN)	SOIL TEMPERATURE (°C)	WATER TEMPERATURE (°C)
11	32.0	22.5
12	31.0	22.5
13	30.5	22.0
14	29.5	22.0
15	28.0	22.0
16	27.0	21.5
17	26.0	21.5
18	25.0	21.0
19	23.5	21.0
20	22.0	20.5

The following graph was then made using the data.



Predict the relative air temperature over ocean and land during the day and night.

A. During the day: air above the land is warmer, above the ocean is cooler. At night: air above the land is cooler, above the ocean is warmer.

B. During the day: air above the land is cooler, above the ocean is warmer. At night: air above the land is warmer, above the ocean is cooler.

C. During the day: air above the land is cooler, above the ocean is warmer. At night: air above the land is cooler, above the ocean is warmer.

D. During the day: air above the land is warmer, above the ocean is cooler. At night: air above the land is warmer, above the ocean is cooler.

ANSWER: A

Explanation:

During the day: air above the land is warmer, above the ocean is cooler. At night: air above the land is cooler, above the ocean is warmer. This follows from the different heating and cooling rates of soil and water shown by the investigation. Land has a lower specific heat capacity than water, so its temperature rises more quickly when it receives radiation from the Sun. The air immediately above the warmer land is heated by contact and convection, making it relatively warmer than air over the ocean during daytime.

After sunset, land also loses heat more rapidly. Water changes temperature more slowly because it has a high specific heat capacity; mixing and evaporation can further moderate changes in ocean-surface temperature. Consequently, the ocean remains relatively warmer through the night, and the air above it is warmer than the air over the more rapidly cooled land. This land–water temperature contrast is an important cause of local coastal wind patterns, including daytime sea breezes and nighttime land breezes. The relationship between water's heat capacity and its slower temperature change is described by the National Oceanic and Atmospheric Administration; coastal daily heating differences are also discussed by the National Weather Service JetStream.

QUESTION NO: 40

Determine whether the underlined portion of the sentence below is correct or whether it needs to be revised.

Most of my favorite movies contain slapstick humor, however physical comedy is not the only way to make me laugh.

A. slapstick humor, however physical comedy is not

B. slapstick humor, but physical comedy is not

C. slapstick humor, and physical comedy is not

D. slapstick humor; physical comedy is not

E. slapstick humor, but it is not physical comedy that is

ANSWER: B

Explanation:

"slapstick humor, but physical comedy is not" is correct because it joins two closely related independent clauses in a single, grammatically complete sentence. The first clause, "Most of my favorite movies contain slapstick humor," expresses one complete idea, while the following clause, "physical comedy is not the only way to make me laugh," expresses a contrasting complete idea. The coordinating conjunction "but" clearly signals that contrast and, when preceded by a comma, correctly connects the two independent clauses.

This revision also preserves the intended meaning: although slapstick and physical comedy appear in many favorite movies, other kinds of humor can also be funny to the writer. The wording is concise and places the contrast exactly where readers expect it. Standard English punctuation permits a comma before a coordinating conjunction joining two independent clauses, a structure commonly called a compound sentence. See the Purdue OWL guidance on commas with coordinating conjunctions and the ACT test description for the emphasis on clear, conventional sentence structure.

QUESTION NO: 41

If $x \times y = 156$, $x + y = 43$, and $x < y$, what is the value of $x - y$?

A. −35

B. 35

C. 0

D. −24

ANSWER: A

Explanation:

The correct answer is **−35**. The conditions state that two numbers have a product of 156 and a sum of 43. The factor pair of 156 that totals 43 is 4 and 39, since 4 × 39 = 156 and 4 + 39 = 43. Because x is specified as less than y, x = 4 and y = 39. Substituting these values into the requested expression gives x − y = 4 − 39 = −35. This result must be negative because subtracting the larger value, y, from the smaller value, x, produces a negative difference. This approach reflects the ACT's expectation that students use the given equations and inequality together, rather than treating the pair's order as interchangeable. For additional review of solving problems involving equations and numerical reasoning, consult ACT's official test-preparation resources and the ACT Math practice guide.

QUESTION NO: 42

What is the value of x when 2x + 7 = 3x − 5?

A. 2

B. 6

C. 12

D. 24

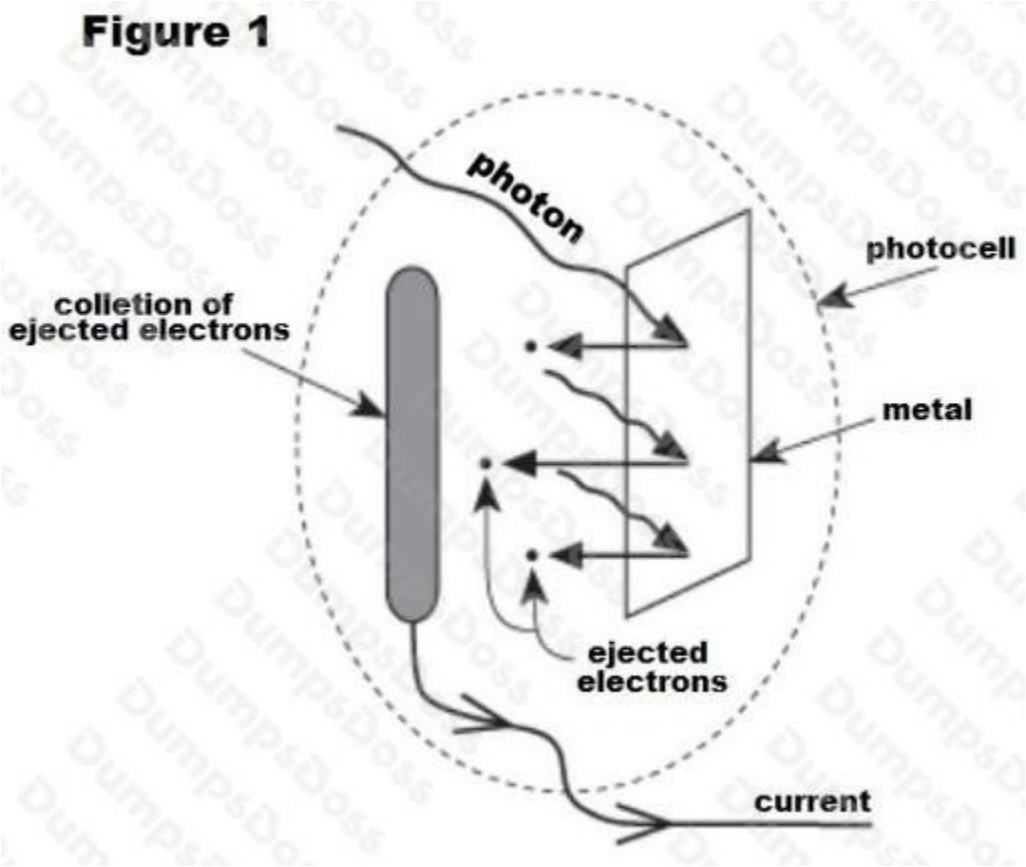
ANSWER: C

Explanation:

The correct value is **12**. To solve the equation, keep the equation balanced while collecting the variable terms on one side. Starting with 2x + 7 = 3x − 5, subtract 2x from both sides. This removes the 2x term from the left and leaves 7 = x − 5. Then add 5 to both sides so that x is isolated: 7 + 5 = x, or 12 = x. Therefore, x equals 12. A quick substitution confirms the result: replacing x with 12 gives 2(12) + 7 = 31 on the left and 3(12) − 5 = 31 on the right. Since both sides have the same value, 12 satisfies the equation. This is a standard linear-equation procedure tested in ACT mathematics: use inverse operations equally on both sides to isolate the variable while preserving equality. For further review of solving linear equations, see Khan Academy: One-variable linear equations and OpenStax: Solve Linear Equations.

QUESTION NO: 43

A photocell is a device for generating an electrical current from light (see Figure 1).



Each photocell contains a metal. A photon of light that strikes the metal can eject an electron from the metal if the photon's energy exceeds the metal's work function. The maximum kinetic energy the ejected electron can have is the photon's energy minus the metal's work function. The amount of electrical current varies with light's relative intensity (a measure of the number of photons with a given energy striking the metal each second).

Table 1 shows the results of 9 trials in which a photocell was exposed to light.

Table 1

Table				
Trial	Energy per photon (eV)*	Relative intensity of light	Electrical current (mA)†	kinetic energy of electron if ejected from metal (eV)
1	2.0	low	0	0.0
2	2.0	medium	0	0.0
3	2.0	high	0	0.0
4	4.0	low	29	0.9
5	4.0	medium	43	0.9
6	4.0	high	60	0.9
7	6.0	low	27	2.9
8	6.0	medium	40	2.9
9	6.0	high	55	2.9
*eV = electron volts				
†mA = milliamps				

When 8.0 eV photons were shone on the photocell, electrons ejected from the metal in the photocell had a maximum kinetic energy of 4.9 eV.

In the photocell discussed in the passage, suppose the work function of the metal had been 5.1 eV. If the energy per photon had been the same as in Trials 7-9, the maximum kinetic energy of electrons that were ejected from the metal would have been:

A. 0.9 eV

B. 2.0 eV

C. 4.0 eV

D. 5.1 eV

ANSWER: A

Explanation:

0.9 eV is correct because the passage directly gives the relationship for the photoelectric effect: the maximum kinetic energy of an emitted electron equals the photon energy minus the metal's work function. The light used in Trials 7–9 has an energy of 6.0 eV per photon. Under the hypothetical condition in the question, the metal has a work function of 5.1 eV. Therefore, the maximum kinetic energy is calculated as 6.0 eV − 5.1 eV = 0.9 eV. Because 6.0 eV is greater than 5.1 eV, photons still provide enough energy to eject electrons; the remaining 0.9 eV becomes the greatest possible kinetic energy of those electrons. This is the standard Einstein photoelectric-equation relationship, commonly written as $K_{max} = E_{photon} - \varphi$, where φ is the work function. Relative intensity affects how many photons arrive and thus can affect current, but it does not change

the maximum kinetic energy when photon energy and work function are fixed. See OpenStax: The Photoelectric Effect and NIST: Planck Constant Reference.

QUESTION NO: 44

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Beloved and The Oprah Effect

[§1] In 1998, the movie adaptation of author Toni Morrison's novel Beloved was released, directed by Jonathan Demme and co-produced by Oprah Winfrey, whom had spent 10 years bringing it to the screen. <1> Winfrey also stars as the main character, Sethe, alongside Danny Glover as Sethe's lover, Paul D, and Thandie Newton as Beloved. <2>

[§2] The movie flopped at the box office. <3> A review in the Economist suggested that "most audiences are not eager to endure nearly three hours of a cerebral film with an original storyline featuring supernatural themes, murder, rape and slavery." Film critic Janet Maslin, however, in her review, "No Peace from a Brutal Legacy," <4> called it a "transfixing, deeply felt adaptation of Toni Morrison's novel. …Its linchpin is of course Oprah Winfrey, who had the clout and foresight to bring 'Beloved' to the screen and has the dramatic presence to hold it together.

[§3] In 1996, television talk show host <5> Winfrey had selected Song of Solomon for her newly launched Book Club, which became a popular feature on her Oprah Winfrey Show. An average of 13 million viewers watched the show's Book Club segments. As a result, <6> when Winfrey selected Morrison's earliest novel, The Bluest Eye in 2000, <7> it sold another 800,000 paperback copies. John Young wrote in the African American Review in 2001 that Morrison's career experienced the boost of the "Oprah Effect, …enabling Morrison to reach a broad, popular audience." Winfrey selected a total of four of Morrison's novels over six years, giving Morrison's novels a bigger sales boost than they got from her Nobel Prize win in 1993. <8> The novelist also appeared three times on Winfrey's show. Winfrey said, "For all those who asked the question 'Toni Morrison again?'…I say with certainty there would have been no Oprah's Book Club if this woman had not chosen to share her love of words with the world." <9> Morrison called the Book Club "a reading revolution." <10>

How do you know if the following phrasing – "in her review, "No Peace from a Brutal Legacy,"" – is a correct use of the non-restrictive appositive?

A. You can remove "No Peace from a Brutal Legacy," and it won't change the meaning of the sentence.

B. You cannot remove "No Peace from a Brutal Legacy," without changing the meaning of the sentence.

C. It is a good descriptor of the review.

D. It is a poor descriptor of the review.

ANSWER: A

Explanation:

"You can remove "No Peace from a Brutal Legacy," and it won't change the meaning of the sentence." is correct because the review title supplies supplementary, rather than essential, information. The grammatical core of the sentence remains complete and clear without it: "Film critic Janet Maslin, however, in her review, called it a 'transfixing, deeply felt adaptation . . . .'" The reader still knows who made the judgment, where she made it, and what her judgment was. The title merely gives the reader the additional identifying detail of the particular review being cited.

This removability test is a practical way to recognize a nonrestrictive appositive or other nonessential interrupting element. Because the detail is parenthetical, commas appropriately set it off from the rest of the sentence. The quoted wording functions as the name of Maslin's review and adds context without changing the sentence's basic claim about her positive assessment of the film. Purdue OWL explains that nonessential material provides extra information and is separated from the rest of a sentence by punctuation: Purdue OWL: Commas with Nonessential Elements. For additional guidance on punctuation used with appositives, see Merriam-Webster: Appositives.

QUESTION NO: 45

The following passage is from a discussion of various ways that living creatures have been classified over the years.

(1) The world can be classified in different ways, depending on one's interests and principles of classification. The classifications (also known as taxonomies) in turn determine which comparisonsseem natural or unnatural, which literal or analogical. For example, it has been common to classify living creatures into three distinct groups – plants, animals, and humans. According to this classification, human beings are not a special kind of animal, nor animals a special kind of plant. Thus, any comparisons between the three groups are strictly analogical. Reasoning from inheritance in garden peas to inheritance in fruit flies, and from these two species to inheritance in human beings, is sheer poetic metaphor.

(2) Another mode of classifying living creatures is commonly attributed to Aristotle. Instead of treating plants, animals, and humans as distinct groups, they are nested. All living creatures possessa vegetative soul that enables them to grow and metabolize. Of these, some also have a sensory soul that enables them to sense their environments and move. One species also has a rational soul that is capable of true understanding. Thus, human beings are a special sort of animal, and animals are a special sort of plant. Given this classification, reasoning from human beings to all other species with respect to the attributes of the vegetative soul is legitimate, reasoning from human beings to other animals with respect to the attributes of the sensory soul is also legitimate, but reasoning from the rational characteristics of the human species to any other species is merely analogical. According to both classifications, the human species is unique. In the first, it has a kingdom all to itself; in the second, it stands at the pinnacle of the taxonomic hierarchy.

(3) Homo sapiens is unique. All species are. But this sort of uniqueness is not enough for many (probably most) people, philosophers included. For some reason, it is very important that the species to which we belong be uniquely unique. It is of utmost importance that the human species be insulated from all other species with respect to how we explain certain qualities. Human beings clearly are capable of developing and learning languages. For some reason, it is very important that the waggle dance performed by bees does not count as a genuine language. I have never been able to understand why. I happen to think that the waggle dance differs from human languages to such a degree that little is gained by terming them both "languages," but even if "language" is so defined that the waggle dance slips in, bees still remain bees. It is equally important to some that no other species use tools. No matter how ingenious other species get in the manipulation of objects in their environment, it is absolutely essential that nothing they do count as "tool use." I, however, fail to see what difference it makes whether any of these devices such as probes and anvils, etc. are really tools. All the species involved remain distinct biological species no matter what decisions are made. Similar observations hold for rationality and anything a computer might do.

The author uses the words "For some reason" to express:

A. rage

B. disapproval

C. despair

D. sympathy

E. uncertainty

ANSWER: B

Explanation:

disapproval is correct because "For some reason" signals the author's skeptical, critical attitude toward people who insist that human beings must be "uniquely unique." The author is not merely reporting that view neutrally. Instead, the repeated phrase introduces claims that the author considers unnecessarily important or poorly justified, such as the insistence that bee communication cannot count as language or that animals' manipulation of objects cannot count as tool use. This attitude is reinforced immediately by the statement, "I have never been able to understand why," and later by "I fail to see what difference it makes." Those comments show that the author disapproves of drawing rigid conceptual boundaries merely to preserve an exceptional status for humans. The passage's tone is therefore mildly ironic and dismissive rather than furious: the author challenges the motivation behind these classifications and regards the concern as misguided. On ACT Reading questions, the best answer should reflect the author's attitude as established by surrounding wording and the passage's overall argumentative purpose. See ACT's overview of the Reading section at ACT Reading Test and its general test-preparation resources at ACT Test Preparation.

QUESTION NO: 46

Determine whether the underlined portion of the sentence below is correct or whether it needs to be revised.

A consummate gentleman, Stefan's etiquette and social grace was unmatched.

A. Stefan's etiquette and social grace was unmatched.

B. Stefan's etiquette and social grace were unmatched.

C. Stefan's etiquette as well as his social grace were unmatched.

D. Stefan possessed unmatched etiquette and social grace.

E. Stefan's social grace was matched only by his etiquette.

ANSWER: D

Explanation:

“Stefan possessed unmatched etiquette and social grace.” is correct because it gives the opening modifier, “A consummate gentleman,” a logical noun to describe: Stefan. An introductory modifying phrase must clearly modify the grammatical subject that immediately follows it. Here, the subject is “Stefan,” so the sentence directly states that he is the consummate gentleman and then identifies the qualities he possesses.

The revision also uses a clear, active construction. “Possessed” makes Stefan the person connected to both “etiquette” and “social grace,” while “unmatched” accurately describes those two qualities. This phrasing avoids any ambiguity about whether the description applies to a person or to an abstract quality. Clear modifier placement is a central principle of standard written English and is especially important on ACT English questions, which test whether sentence elements are logically and grammatically connected. Purdue OWL explains that modifiers should be placed near the words they modify: Purdue OWL: Modifiers. ACT also identifies conventions of standard English, including sentence structure and usage, as assessed skills: ACT English Test Description.

QUESTION NO: 47

The expression 4x2 − 2x + 3 is equal to 3 when x = 0 and when x =

A. −1/2

B. −1/4

C. 1/8

D. 1/4

E. 1/2

ANSWER: E

Explanation:

The value is **1/2**. To find the other value of *x* for which the expression equals 3, set the expression equal to 3: $4x^2 - 2x + 3 = 3$. Subtracting 3 from both sides gives $4x^2 - 2x = 0$. Factoring the left side produces $2x(2x - 1) = 0$. By the zero-product property, either $2x = 0$, which gives $x = 0$, or $2x - 1 = 0$, which gives $x = 1/2$. Since the question already identifies $x = 0$ as one solution, the requested additional value is 1/2. Substitution verifies the result: $4(1/2)^2 - 2(1/2) + 3 = 4(1/4) - 1 + 3 = 1 - 1 + 3 = 3$. This is an example of solving a quadratic equation by moving all terms to one side and factoring. For a review of factoring quadratics and using the zero-product property, see OpenStax Elementary Algebra and Khan Academy’s quadratics resources.

QUESTION NO: 48

Researchers studied sprinting ability to better understand differences between individuals in performance. After completion of the first study, researchers performed two follow up studies to explore the movement economy of and physiological response to sprinting. The same five subjects were used for each study.

Study 1

Five healthy adult subjects with similar body weight and height were familiarized with the sprinting technique. Each subject was instructed to sprint as fast as they could in a linear path for 20 yards. Infrared timing gates were placed at 5 yards (G1), 10 yards (G2), 15 yards (G3), and 20 yards (G4) into the route to record timing and later extrapolate speed.

	G1 (seconds)	G2 (seconds)	G3 (seconds)	G4 (seconds)
Subject 1	0.98	1.71	2.45	3.49
Subject 2	0.88	1.63	2.42	3.51
Subject 3	0.93	1.65	2.39	3.47
Subject 4	1.24	2.01	2.88	3.94
Subject 5	1.11	1.83	2.66	3.72

Figure 1

Study 2

The five healthy adult subjects from Study 1 were instructed to sprint as fast as they could in a linear path for 15 yards. An in-ground force plate was inserted on the route at the 10-yard point with the capacity to measure peak propulsive and braking forces in newtons. Propulsive forces have vectors in the +y direction and contribute to acceleration while sprinting. Braking forces have vectors in the −y direction and contribute to deceleration while sprinting.

	Peak Propulsive Force (newtons)	Peak Braking Force (newtons)
Subject 1	85	13
Subject 2	79	17
Subject 3	88	12
Subject 4	102	50
Subject 5	65	10

Figure 2

Study 3

The five healthy adult subjects from Study 1 and Study 2 were instructed to sprint as fast as they could in a linear path until they could no longer do so. Immediately after completion of their route blood samples were extracted from subjects. Blood samples were analyzed to measure concentration of blood lactate: larger quantities are a known biomarker for muscular fatigue.

In Study 2, which subject is suggested to be moving fastest based on peak propulsive and braking forces?

A. Subject 1

B. Subject 3

C. Subject 4

D. Subject 5

ANSWER: B

Explanation:

Subject 3 is suggested to be moving fastest because the force-plate results show the largest net force in the forward, +y direction. Net force is found by combining the force vectors: the forward propulsive force increases motion in the sprint direction, while the backward braking force reduces it. For Subject 3, the difference between peak propulsive force and peak braking force is 76 N, the greatest forward net peak force among the subjects shown. Because the participants were

selected to have similar body weights, their masses can reasonably be treated as comparable for this interpretation. Under Newton's second law, a greater net force on comparable masses produces greater acceleration. Thus, at the measured point in the sprint, Subject 3's force pattern most strongly indicates continued forward acceleration and supports the conclusion that this subject is moving fastest. This conclusion uses the study's stated directional definitions and compares the resultant, rather than considering propulsive or braking force alone. For background on the relationship among net force, mass, and acceleration, see OpenStax: Newton's Second Law of Motion. The use of force plates to measure ground-reaction forces in human movement is also described by the National Library of Medicine.

QUESTION NO: 49

A number cube is labeled with the numbers one through six, with one number on each side of the cube. What is the probability of rolling either a number that is even or a number that is a factor of 9?

A. 1/3

B. 1/2

C. 2/3

D. 5/6

E. 1

ANSWER: D

Explanation:

The correct answer is **5/6**. A fair number cube labeled 1 through 6 has six equally likely outcomes. The even outcomes are 2, 4, and 6. The positive factors of 9 that appear on this cube are 1 and 3. Thus, the outcomes that satisfy "even or a factor of 9" are 1, 2, 3, 4, and 6, for a total of five favorable outcomes. The word "or" means that any outcome meeting at least one of the two conditions is included. Since none of the factors of 9 on the cube are even, there is no overlap to account for. Therefore, the probability is the number of favorable outcomes divided by the total number of possible outcomes: 5/6. This can also be found by adding the probabilities: 3/6 for an even result plus 2/6 for a factor of 9, giving 5/6. ACT mathematics questions use standard probability reasoning: when outcomes are equally likely, probability is calculated as favorable outcomes over total outcomes. See OpenStax: Probability and ACT Test Preparation.

QUESTION NO: 50

The following passage is followed by questions based on its content. Think about what is implied or stated in each paragraph and then answer the questions.

(1) For perhaps the tenth time since the clock struck two, Sylvia crosses to the front-facing window of her apartment, pulls back the blue curtain, and looks down at the street. People hurry alongthe sidewalk; although she watches for several long moments, she sees no one enter her building.

(2) She walks back to the center of the high-ceilinged living room, where she stands frowning and twisting a silver bracelet around and around on her wrist. She is an attractive young woman,although perhaps too thin and with a look that is faintly ascetic; her face is narrow and delicate, her fine, light-brown hair caught back by a tortoiseshell comb. She is restless now, because she is being kept waiting. It is nearly two-thirty – a woman named Lola Parrish was to come at two o'clock to look at the apartment.

(3) She considers leaving a note and going out. The woman is late, and besides, Sylvia is certain that Lola Parrish will not be a suitable person with whom to share the apartment. On the phoneshe had sounded too old, for one thing – her voice oddly flat and as deep as a man's. However, the moment for saying the apartment was no longer available slipped past, and Sylvia found herself agreeing to the two o'clock appointment. If she leaves now, as she has a perfect right to do, she can avoid the awkwardness of turning the woman away.

(4) Looking past the blue curtain, however, she sees the sky is not clear but veiled by a white haze, and the air is oppressively still. She knows that the haze, the stillness, and the heat areconditions that often precede a summer thunderstorm – one of the abrupt, swiftly descending electrical storms that have terrified her since she was a child. If a storm comes, she wants to be at home in her own place.

(5) She walks back to the center of the room, aware now that the idea of sharing the apartment has actually begun to repel her. Still, she knows she will have to become accustomed to thenotion, because her savings are nearly gone and the small trust fund left by her father, exhausted. She has a low-paying job, and, while she has considered seeking another (perhaps something connected with music – in her childhood she had played the flute and people had said she was gifted), she has found herself dragged down by a strange inertia.

(6) Besides, although her job pays poorly, it suits her. She is a typist in a natural history museum, with an office on the top floor and a window onto the nearby aviary. The man for whom sheworks, a curator who is rarely in, allows Sylvia to have the office to herself. The aviary consists of three enormous, white rooms, each with a high, vaulted ceiling. The birds themselves, so beautifully mounted they seem alive, are displayed in elaborate dioramas. Behind glass, they perch in trees with leaves of sculpted metal, appearing to soar through painted forests, above painted rivers and marshes. Everything is rendered in exquisite detail. Glancing at the birds and up through the skylight at the limitless outdoors keeps her mild claustrophobia at bay.

It can be reasonably inferred from the passage that Sylvia's job suits her because:

A. her office is tastefully decorated.

B. she is musical and enjoys the singing of birds.

C. she is able to work alone in a space that feels open.

D. it is challenging, and offers the opportunity to learn new skills.

ANSWER: C

Explanation:

The correct answer is *"she is able to work alone in a space that feels open."* The passage directly establishes both parts of this inference. Sylvia's curator is "rarely in" and allows her to have the office to herself, so her work environment provides solitude. This is significant because Sylvia is portrayed as someone who is uneasy, withdrawn, and reluctant to make major changes, including sharing her apartment with another person. A private office therefore contributes to the job's suitability for her.

The description of the museum also emphasizes spaciousness and visual openness: Sylvia works on the top floor, has a window facing the aviary, and can look through a skylight toward the "limitless outdoors." Most decisively, the passage explicitly states that these views keep her mild claustrophobia "at bay." Thus, the setting helps her manage a personal discomfort that might otherwise make indoor work difficult. The answer accurately combines the textual evidence about working alone with the evidence that the expansive surroundings help Sylvia feel less confined. This is the type of evidence-based inference assessed in ACT Reading questions: readers should connect details stated in the passage to reach a conclusion supported by the text. See the ACT Preparing for the ACT guide and the ACT test description.

QUESTION NO: 51

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Gateway Arch

[§1] The skyline of St. Louis, Missouri, is fairly unremarkable, with one huge exception, the <1> Gateway Arch that stands on the banks of the Mississippi. Part of the Jefferson National Expansion Memorial, the Arch is a really cool monument <2> built to honor St. Louis' role as the gateway to the West.

[§2] Construction on the 630-foot high structure began, in 1961, <3> and was completed four years later in 1965. The monument includes an underground visitor center that explores westward expansion through galleries and a theater. Two passenger trams take visitors to the Observation Room and the Museum of Westward Expansion at the top.

[§3] In 1947, a group of interested citizens known as the Jefferson National Expansion Memorial Association held a nationwide competition to select a design for a new monument that would celebrate <4> the growth of the United States. Other U.S. monuments are spires, statues, or imposed buildings, <5> but the winner of this contest was a plan for a completely unique structure. The man that <6> submitted the winning design, Eero Saarinen, later became a famous

architect. In designing the Arch, Saarinen wanted to “create a monument which would have lasting significance and would be a landmark of our time.”

[§4] The Gateway Arch is a masterpiece of engineering, a monument even taller than the Great Pyramid in Egypt, and on its own way, <7> at least as majestic. The Gateway is an inverted catenary curve, the same shape that a heavy chain will form if suspended between two points. Covered from top to bottom with sleek stainless steel coating, <8> the Arch often reflects dazzling bursts of sunlight. In a beautiful display of symmetry, the height of the arch is the same as the distance between the legs at ground level.

<2>:

A. NO CHANGE

B. a structure that inspires amazement

C. an amazing structure

D. OMIT the underlined portion

ANSWER: C

Explanation:

an amazing structure is the best revision because it conveys the intended admiration for the Gateway Arch while maintaining the informative, polished tone of the passage. The surrounding paragraphs describe the Arch’s historical purpose, unusual design, engineering achievement, stainless-steel exterior, and visual grandeur. Calling it “an amazing structure” fits naturally with that factual yet appreciative description. It also creates a smooth, grammatical sentence: “Part of the Jefferson National Expansion Memorial, the Arch is an amazing structure built to honor St. Louis’ role as the gateway to the West.” The participial phrase “built to honor” clearly modifies “structure,” so the reader can immediately understand both what the Arch is and why it was constructed. In ACT English questions, the strongest choice generally preserves the author’s meaning while using wording that is concise, precise, and appropriate for the passage’s style. This phrasing does so without becoming overly casual or excessively wordy. The National Park Service identifies the Gateway Arch as a monument commemorating westward expansion and St. Louis’s historical role in that story, supporting the passage’s emphasis on the Arch’s importance and grandeur. See the National Park Service’s Gateway Arch National Park page and ACT English practice resources.

QUESTION NO: 52

Determine whether the underlined portion of the sentence below is correct or whether it needs to be revised.

Inside the glove compartment were legal documents, pictures, and there were a few napkins from the coffee shop, but no gloves.

A. and there were a few napkins from the coffee shop, but no gloves.

B. and there were a few napkins from the coffee shop, but not any gloves.

C. and napkins from the coffee shop, no gloves were there.

D. and napkins from the coffee shop, but no gloves.

E. and napkins from the coffee shop, there were no gloves.

ANSWER: D

Explanation:

The revision *“and napkins from the coffee shop, but no gloves.”* is correct because it creates a clear, parallel series identifying the items inside the glove compartment: legal documents, pictures, napkins, and no gloves. Each item functions as a noun or noun phrase governed by the introductory phrase “Inside the glove compartment were.” This structure makes the sentence concise and easy to follow. The final phrase, “but no gloves,” appropriately provides contrast: although the compartment contains several items, it does not contain the item one might expect to find there. The coordinating conjunction “but” makes that contrast explicit without interrupting the list’s grammatical pattern. Standard English editing on

the ACT emphasizes maintaining parallel structure, particularly when a sentence presents a series of equivalent items or ideas. A parallel list helps readers immediately recognize how the listed elements relate to the same verb and setting. This revision also preserves the humorous ending while expressing the complete thought in one well-constructed sentence. For ACT English preparation guidance, see ACT English practice questions and the ACT test-preparation resources.

QUESTION NO: 53

(1) When I first heard the term “illuminated manuscript” and learned of its association with medieval monasteries, I pictured hand-lettered parchment texts actually lighted from within by a kind ofbenevolent, supernatural light. I soon discovered, however, that the adjective illuminated” in this case had nothing to do with light, nor did it always have to do with the Christian church or with medieval times. Rather, “to illuminate” simply meant “to adorn” the pages of a manuscript, usually with brilliant colors and sometimes even with precious metals or stones.

(2) Although illuminated manuscripts reached their apogee in the Middle Ages and are best known as a product of the medieval Christian church, they actually had their origins in Egypt, nearly four thousand years ago. The first known illuminated manuscript was the Egyptian Book of the Dead, which contained instructions for the ceremonies for burial of the dead and the prayers to be said by those left behind. Originally, those books were commissioned by royalty, nobility, and others of high rank, but eventually even ordinary people could purchase them. Among the scenes commonly contained in the Egyptian Book of the Dead were the funeral cortege and the mummification process, as well as depictions of the deceased in the afterlife. Thanks to the dry climate in Egypt, a number of these ancient manuscripts have survived.

(3) The practice of illuminating manuscripts flourished in Europe. The Vatican Library houses two manuscripts by Virgil, and a copy of the Iliad by Homer resides in the Biblioteca Ambrosiana in Milan. A few Bibles and religious storybooks have survived also. Hellenistic and Roman wall painting influenced the illustrations in these texts, and as the age progressed, the artwork came to be more influenced by classical art with biblical themes. By the seventh century, the most important illuminated manuscripts were the prayer books being produced in monasteries in England and Ireland. The illustrators were greatly influenced by Celtic metalwork from previous centuries, and the works are beautiful and impressive (though they may look slightly primitive to modern eyes as the artists have made no effort to give a sense of perspective).

(4) By the tenth and eleventh centuries, monasteries in England moved away from their Celtic influence and embraced the Carolingian style. The pictures in these manuscripts, drawn for royalsand other wealthy patrons, became more interpretive, actually illustrating passages from the book, with stylized figures looking rather severely out at the reader. By the twelfth century, these English illuminators were integrating illustration and decoration into the text. Bibles made in England at this time contained entire scenes. Many of these manuscripts also presented mythical figures, like dragons or part-human, part-animal figures that did not relate directly to the text.

(5) By the Gothic period, the urbanization of Europe led to increasing numbers of illuminated manuscripts. The illustrations became more realistic: The figures wore the clothes of the day andwere shown in contemporary settings. The artists also began to be concerned with balance and perspective. The handwritten books and scrolls were embellished with decorations and illustrations intended to enhance the text, and the paints used were made from natural materials such as minerals and stones. Red, brown, orange, and yellow were derived from ochers and metals; blue came from lapis lazulim azurite, or indigo. In Europe, artists also applied gold leaf.

(6) During the Middle Ages, the illumination of manuscripts was an important art form, and illuminations employed a variety of decorations and enhancements. Although most of the books beganwith an imaginary portrait of the book’s author or its patron, in some the first page contained abstract designs that were reminiscent of the Oriental carpet, and thus, the first page later came to be known as the carpet page. Texts of this time usually had enlarged and embellished initial letters – sometimes shaped like animals, birds, or flowers. Some particularly important texts religious, literary, or historical – might have full-page illustrations, which would be placed either at the appropriate point in the text or grouped together at the beginning.

(7) During the Renaissance, patrons continued to order these hand-illuminated manuscripts even though the printing press (c. 1450) made mass production of manuscripts by machine possible.This was not true in the Middle East, however. Consequently, the illuminated manuscript kept its influential role and many exquisite examples survive to this day. Although the invention of the printing press could be said to mark the beginning of the end for illuminated manuscripts in Europe and elsewhere, they performed an invaluable service during their long history. Because of widespread illiteracy throughout history, pictures have always been an important source of information. Even people who could not read – whether in ancient Egypt or medieval Europe could glean information from the illustrated pages. Perhaps the image of a page lighted from within is not such a far-fetched description of the illuminated manuscript, after all.

Based on the information in the passage, all of the following are accurate statements about the Egyptian Book of the Dead EXCEPT:

A. The climate in Egypt affected the fate of the Egyptian Book of the Dead manuscripts.

B. The Egyptian Book of the Dead describes burial ceremonies.

C. The Egyptian Book of the Dead explains significance of the pyramids.

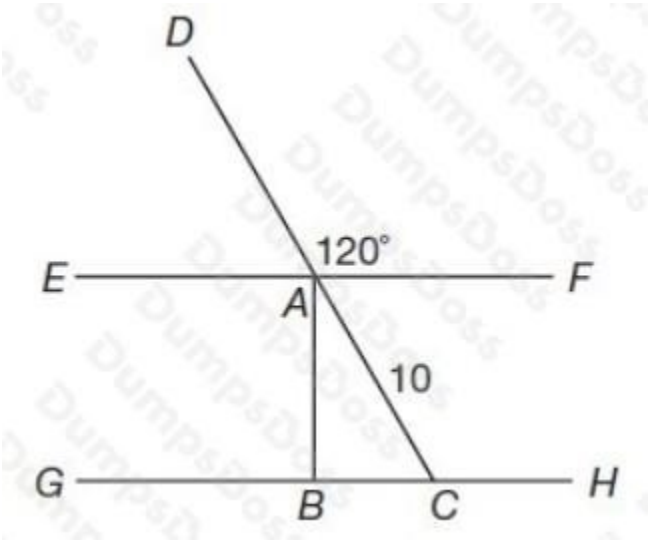
D. Eventually, even the common people had access to the Egyptian Book of the Dead.

ANSWER: C

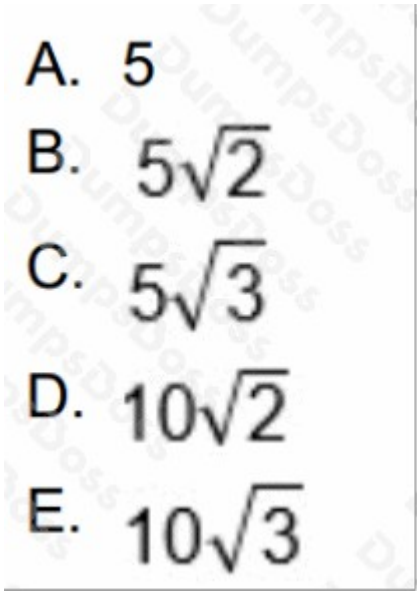
Explanation:

“The Egyptian Book of the Dead explains significance of the pyramids.” is the correct EXCEPT response because the passage gives no information indicating that these manuscripts explained pyramids or their importance. Instead, the discussion identifies the Book of the Dead as an early illuminated manuscript containing instructions for burial ceremonies and prayers for survivors. It also describes common illustrations: funeral processions, mummification, and images of the deceased in the afterlife. The paragraph further states that the works were initially commissioned by elite patrons and later became available for ordinary people to purchase, and that Egypt’s dry climate helped preserve surviving examples. None of those details establishes a connection to pyramids, much less an explanation of their significance. Thus, the pyramids statement is the one that cannot accurately be concluded from the passage. This conclusion is also consistent with museum descriptions of the Book of the Dead as a collection of funerary texts, spells, and images intended to assist the dead in the afterlife, rather than a work about pyramid architecture or symbolism. See the Metropolitan Museum of Art’s overview of the Book of the Dead and the British Museum’s Egyptian death and afterlife collection.

QUESTION NO: 54



In the diagram above, lines EF and GH are parallel, and line AB is perpendicular to lines EF and GH. What is the length of line AB?



A. Option A

B. Option B

C. 5√3

D. Option D

E. Option E

ANSWER: C

Explanation:

The correct length is **5√3**. Because line AB is perpendicular to the parallel horizontal lines, triangle ABC has a right angle at B. The marked 120° angle formed by the transversal and one parallel line has an equal alternate interior angle at C. Since that 120° angle and the interior angle at C form a straight line, the angle at C measures 60° (180° − 120°). The remaining acute angle in right triangle ABC is therefore 30°.

This establishes that triangle ABC is a 30°-60°-90° triangle. Such a triangle has side lengths in the fixed ratio 1 : √3 : 2, where the side opposite 30° is the shortest leg and the hypotenuse is twice that shortest leg. The diagram gives hypotenuse AC as 10, so the short leg BC is 5. Line AB lies opposite the 60° angle, making it the longer leg. Thus, AB = 5 × √3 = **5√3**. This use of special-right-triangle ratios follows standard Euclidean geometry relationships; see OpenStax: Special Triangles and Khan Academy: Special Right Triangles.

QUESTION NO: 55

Should Churches Be Taxed? Pros and Cons

http://churchesandtaxes.procon.org

'PRO' PASSAGE

(1) Exempting churches from taxation upholds the separation of church and state embodied by the Establishment Clause of the First Amendment of the US Constitution. The US Supreme Court, in a majority opinion written by Chief Justice Warren

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”

(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut

them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”

(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.

(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”

(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren

E. Burger in his majority opinion in Walz

v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”

(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.

'CON' PASSAGE

(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”

(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.

(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.

(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”

(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

H. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."

(12) The tax code makes no distinction between authentic religions and fraudulent startup “faiths,” which benefit at taxpayers’ expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties. In Mar. 2004, the IRS warned of an increase in schemes that “exploit legitimate laws to establish sham one-person, nonprofit religious corporations” charging $1,000 or more per person to attend “seminars.” The Church of Scientology, which TIME Magazine described in May 1991 as a “thriving cult of greed and power” and “a hugely profitable global racket,” was granted federal income tax exemption in Oct. 1993. The New York Times reported that this “saved the church tens of millions of dollars in taxes.”

This question pertains to the “PRO” portion of the passage. Choose the answer that best completes the following question.

According to the author, requiring churches to pay taxes would:

A. Endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the U.S. Constitution.

B. Be a privilege, not a right.

C. Constitute special treatment from the IRS beyond what other nonprofits receive.

D. Violate the separation of church and state.

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”
(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”
(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.
(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”
(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren
Burger in his majority opinion in Walz
v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”
(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.
'CON' PASSAGE
(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”
(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.
(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.
(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”
(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

F. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."
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This question pertains to the “PRO” portion of the passage. Choose the answer that best completes the following question. According to the author, requiring churches to pay taxes would:

ANSWER: A

Explanation:

The passage directly states that requiring churches to pay taxes would “endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the U.S. Constitution.” This is the author’s central claim in the second numbered paragraph of the pro passage and therefore precisely completes the sentence stem. The author develops that claim by asserting that taxation would give government enforcement power over churches: a church that did not pay could face penalties or closure. To support the point, the passage invokes the principle from *McCulloch v. Maryland* that “the power to tax involves the power to destroy,” using it to argue that taxation could imperil a religious institution’s ability to function and practice its faith. The answer is thus supported by an explicit statement in the designated pro passage, not an inference drawn from the opposing passage. The First Amendment includes a Free Exercise Clause protecting religious exercise, while the cited case contains the well-known language about the taxing power. See the Constitution Annotated’s text of the First Amendment and the McCulloch v. Maryland decision.

QUESTION NO: 56

The expression is equivalent to:

A. 5/7

B. x + 5

C. (x + 5) / (x + 7)

D. −5 / (2x − 7)

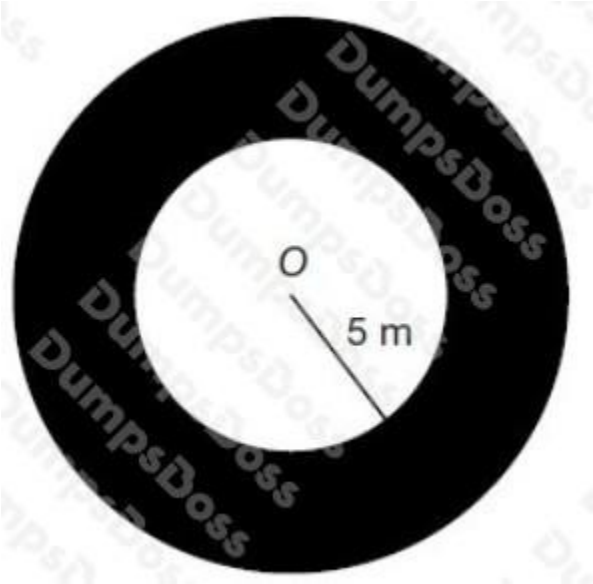
E. (2x − 15) / (4x − 21)

ANSWER: C

Explanation:

The equivalent expression is **(x + 5) / (x + 7)**. Factor each quadratic in the original rational expression: $x^2 + 2x - 15$ factors as $(x + 5)(x - 3)$, because 5 and −3 multiply to −15 and add to 2. Likewise, $x^2 + 4x - 21$ factors as $(x + 7)(x - 3)$, because 7 and −3 multiply to −21 and add to 4. The common nonzero factor $(x - 3)$ can then be divided out of both the numerator and denominator, leaving $(x + 5)/(x + 7)$. This simplification is valid for values in the original expression’s domain; in particular, x cannot equal 3 or −7, since either value makes the original denominator zero. On ACT-style algebra questions, factoring completely before canceling is a reliable way to simplify rational expressions. It is important that cancellation applies to common factors of an entire numerator and denominator, as occurs here. For further review of factoring quadratics and simplifying rational expressions, see OpenStax: Simplify Rational Expressions and OpenStax: Factor Trinomials.

QUESTION NO: 57



The radius of the outer circle shown above is 1.2 times greater than the radius of the inner circle. What is the area of the shaded region?

A. 6π m2

B. 9π m2

C. 25π m2

D. 30π m2

E. 36π m2

ANSWER: B

Explanation:

The shaded region is an annulus, so its area equals the area of the larger circle minus the area of the smaller circle. The diagram gives the inner-circle radius as 5 meters. Using the stated intended multiplicative relationship, the outer radius is 1.2 × 5 = 6 meters. The circle-area formula is $A = \pi r^2$. Therefore, the outer circle has area $\pi(6)^2 = 36\pi$ square meters, and the inner circle has area $\pi(5)^2 = 25\pi$ square meters. Subtracting the unshaded inner area from the full outer-circle area gives $36\pi - 25\pi = 9\pi$ square meters. Thus, **9π m2** is the area of the shaded region. This method follows the standard ACT approach of translating the diagram's dimensions into geometric formulas and retaining π in an exact answer rather than using a decimal approximation. For review of circle area and related geometry formulas, see OpenStax: Use Properties of Circles. ACT's official preparation resources are available at ACT Test Preparation.

QUESTION NO: 58

Excerpt from http://www.nationalgeographic.com/science/prehistoric-world/cretaceous/

CRETACEOUS PERIOD

During this period, oceans formed as land shifted and broke out of one big supercontinent into smaller ones.

(1) Continents were on the move in the Cretaceous, busy remodeling the shape and tone of life on Earth. At the start of the period, dinosaurs ruled the loosening remnants of the supercontinentPangaea as rodents scurried at their feet through forests of ferns, cycads, and conifers. At the end of the period, about 80 million years later, oceans filled yawning gaps between isolated continents shaped much as they are today. Flowering plants were spreading across the landscape. And mammals sat poised to fill the void that soon would be left by the vanished dinosaurs. A giant crater smoldered on what would become known as the Yucatán Peninsula.

EXTINCT SPECIES

(2) Whether or not the asteroid or comet that carved the Chicxulub crater caused the extinction of more than half the planet's species at the end of the Cretaceous remains a matter of scientific debate. But the shifted continents, expanded coasts, and widened oceans had cooled and moistened the planet's climate and set in motion dramatic changes to the flora and fauna. An extraterrestrial impact or a bout of volcanism from within was perhaps too much for many of Earth's species to handle.

(3) Long before the carnage began, the Cretaceous picked up where the Jurassic left off: Gigantic sauropods led parades of dinosaurs through the forests, over the plains, and along the coasts; long-necked and toothy marine reptiles terrorized fish, ammonites, and mollusks in the seas; pterosaurs and hairy-feathered birds filled the skies. But as the continents spread, the ocean currents churned with ever more vigor. After a temperature spike in the mid-Cretaceous, the climate began to cool, and the tenor changed.

NEW DINOSAURS

(4) Though dinosaurs ruled throughout the Cretaceous, the dominant groups shifted and many new types evolved. Sauropods dominated the southern continents but became rare in the north. Herd-dwelling ornithischians like Iguanodon spread everywhere but Antarctica. Toward the close of the Cretaceous, vast herds of horned beasts such as Triceratops munched cycads and other low-lying plants on the northern continents. The carnivore Tyrannosaurus rex dominated the late Cretaceous in the north while monstrous meat-eaters like Spinosaurus, which had a huge sail-like fin on its back, thrived in the south. Smaller carnivores likely battled for the scraps.

(5) Other creatures, such as frogs, salamanders, turtles, crocodiles, and snakes, proliferated on the expanded coasts. Shrewlike mammals scurried about the forests. The largest pterosaurknown soared overhead though the group as a whole faced ever stiffening competition from fast diversifying birds: ancestors to modern grebes, cormorants, pelicans, and sandpipers all show up in the Cretaceous.

(6) In the warm, shallow seas that spilled onto the continents, the long-necked plesiosaurs gave way to the giant, snakelike mosasaurs. Rays and modern sharks became common. Sea urchinsand sea stars (starfish) thrived; coral reefs continued to grow. Diatoms, a type of shelled plankton, made their first radiation into the ocean.

(7) But it was the rapid dispersal of flowering plants that stole the show – a spread enhanced with the help of insects from bees and wasps to ants and beetles. Magnolia, ficus, and sassafrasquickly outnumbered ferns, conifers, gingkoes, and cycads.

(8) Much of this rich life – including all dinosaurs, pterosaurs, pliosaurs, and ammonites – perished in the extinction event at the end of the period 65 million years ago. In fact, the land, seas, andskies would never be the same in the new era that dawned after the close of the Mesozoic era.

The author most likely believes the major land development of the Cretaceous period to be:

A. A volcanic eruption.

B. The proliferation of flora.

C. The breaking up of the Pangean supercontinent.

D. The drying up of ocean life.

ANSWER: C

Explanation:

The breaking up of the Pangean supercontinent is correct because the passage identifies continental separation as the central physical change to Earth's land during the Cretaceous. Its opening directly frames the period as a time when land shifted and broke out of one supercontinent into smaller landmasses. The first paragraph then develops that idea across the period's timeline: it begins with the "loosening remnants" of Pangaea and ends with oceans occupying the gaps between isolated continents that had taken on forms broadly similar to those of today. This is a major land development because it concerns the arrangement and division of the planet's continents themselves, rather than a change affecting a particular type of organism or ecosystem. The discussion of expanded coasts, widened oceans, altered currents, and climatic change further shows the far-reaching environmental consequences of continental movement. Modern geology likewise recognizes the Cretaceous as an interval of continuing plate-tectonic reorganization following the breakup of Pangaea. The Encyclopaedia Britannica overview of Pangaea describes the supercontinent and its breakup, while the U.S. Geological Survey's account of plate tectonics explains how continental movement reshapes oceans and land over geologic time.

QUESTION NO: 59

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

J. K. Rowling

[§1] While many people may get frustrated with train delays, Joanne Rowling turned her experience into a life-changing story. She began writing about a young wizard while delayed at a

Manchester station stop, and brought Harry Potter to life <1> over the next five years. The Philosopher's Stone was the first of seven children's books published under her pen name J. K.

The Harry Potter series has sold over 447 million copies worldwide and been translated into seventy-three languages, including Latin and Ancient Greek. <2>

[§2] When the Philosopher's Stone was published <3> in 1997, the book industry had given up on young readers. It's <4> first edition was a mere 500 books, and most copies were sent to public libraries across England. By the time Rowling's seventh Harry Potter novel was published in 2007, Rowling had already become the woman who put a new face on children's literacy. Harry Potter and the Deathly Hollows, the final installation, has <5> a word count of nearly 1.1 million words, and sold 11 million copies in the first 24 hours of its release. <6>

[§3] Today, Rowling spends much <7> of her time working with her foundation, Lumos, which is named after a spell in the Potter series that brought light into darkness. <8> She founded <9> the nonprofit organization after seeing a photograph of a child in a caged bed who appeared to be screaming through its chain links. Rowling was overcome by the image that she <10> vowed to use her money and popularity to raise awareness of the 8 million children who live in such institutions globally. According to research, over 80 % of orphaned children have living relatives which <11> cannot care for them because of poverty or disability. The staff at Lumos equip families with necessary resources to provide for their children rather than leaving them institutionalized. Lumos' long-term goal is the closure of every orphanage around the world, by returning all children to live with its <12> families, either biological or adoptive.

[§4] Rowling once said, "Happiness can be found in the darkest places if one only remembers to turn on the light". <13> J. K. Rowling has created happiness for millions of children through makebelieve stories of triumph and real-life stories of hope. <14>

The most appropriate sentence to place at the end of paragraph 2 <6> as a transition to paragraph 3 is:

A. Although Rowling's legacy in children's literacy is profound, she recently discovered a new passion for children's causes.

B. Rowling's legacy as a children's writer will likely be forgotten because of her new work with children who are orphans.

C. Rowling's books are not as important as the new work she is doing to help children in orphanages.

D. Someday, people will only remember the Harry Potter movies, and not Rowling's books.

E. K. Rowling

[§1] While many people may get frustrated with train delays, Joanne Rowling turned her experience into a life-changing story. She began writing about a young wizard while delayed at a
Manchester station stop, and brought Harry Potter to life <1> over the next five years. The Philosopher's Stone was the first of seven children's books published under her pen name J. K.
The Harry Potter series has sold over 447 million copies worldwide and been translated into seventy-three languages, including Latin and Ancient Greek. <2>
[§2] When the Philosopher's Stone was published <3> in 1997, the book industry had given up on young readers. It's <4> first edition was a mere 500 books, and most copies were sent to public libraries across England. By the time Rowling's seventh Harry Potter novel was published in 2007, Rowling had already become the woman who put a new face on children's literacy. Harry Potter and the Deathly Hollows, the final installation, has <5> a word count of nearly 1.1 million words, and sold 11 million copies in the first 24 hours of its release. <6>
[§3] Today, Rowling spends much <7> of her time working with her foundation, Lumos, which is named after a spell in the Potter series that brought light into darkness. <8> She founded <9> the nonprofit organization after seeing a photograph of a child in a caged bed who appeared to be screaming through its chain links. Rowling was overcome by the image that she <10> vowed to use her money and popularity to raise awareness of the 8 million children who live in such institutions globally. According to research, over 80 % of orphaned children have living relatives which <11> cannot care for them because of poverty or disability. The staff at Lumos equip families with necessary resources to provide for their children rather than leaving them institutionalized. Lumos' long-term goal is the closure of every orphanage around the world, by

returning all children to live with its <12> families, either biological or adoptive.
[§4] Rowling once said, “Happiness can be found in the darkest places if one only remembers to turn on the light”. <13> J. K. Rowling has created happiness for millions of children through makebelieve stories of triumph and real-life stories of hope. <14>
The most appropriate sentence to place at the end of paragraph 2 <6> as a transition to paragraph 3 is:

ANSWER: A

Explanation:

“Although Rowling’s legacy in children’s literacy is profound, she recently discovered a new passion for children’s causes.” is the most effective transition because it connects the two distinct but related subjects of the surrounding paragraphs. Paragraph 2 establishes Rowling’s profound influence on children’s literacy through the extraordinary success of the Harry Potter books. The proposed sentence briefly acknowledges that accomplishment with “Although Rowling’s legacy in children’s literacy is profound,” then signals a shift with “she recently discovered a new passion for children’s causes.” That forward-looking phrase prepares readers for paragraph 3, which describes Rowling’s work with Lumos and her advocacy for children living in institutions. The sentence therefore creates a clear logical bridge: Rowling’s literary impact is important, but the passage is now moving to her humanitarian work. It also maintains the passage’s respectful, informative tone and avoids introducing details that paragraph 3 does not develop. On ACT English questions involving organization and transitions, the best choice should establish a meaningful relationship between the preceding material and the material that follows, rather than merely repeat a point. See ACT’s description of the English test’s focus on organization and cohesion at ACT English practice resources and the official ACT test overview.

QUESTION NO: 60

The number of decibels, d, produced by an audio source can be modeled by the equation:

$$d = 10 \log\left(\frac{I}{K}\right),$$

where I is the sound intensity of the audio source and K is a constant.

How many decibels are produced by an audio source whose sound intensity is 1,000 times the value of K?

A. 4

B. 30

C. 40

D. 100

E. 10,000

ANSWER: B

Explanation:

The correct answer is **30**. In the decibel model, the intensity is compared with the reference constant *K* inside a base-ten logarithm. If the source intensity is 1,000 times *K*, then *I = 1,000K*. Substituting this into the ratio gives *I/K = 1,000K/K = 1,000*. The common logarithm of 1,000 is 3 because $10^3 = 1{,}000$. The formula then multiplies that logarithm by 10, so the decibel value is *10 × 3 = 30*. Thus, an intensity that is one thousand times the reference intensity corresponds to 30 decibels under this model. This calculation illustrates the logarithmic nature of the decibel scale: each factor of 10 in an intensity ratio contributes 10 decibels, and three such factors produce 30 decibels. For background on logarithms and their inverse relationship with powers of ten, see OpenStax College Algebra: Logarithmic Functions. For a technical definition of sound level in decibels, see Encyclopaedia Britannica: Decibel.

QUESTION NO: 61

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Planet Earth's Windiest Observatory

[§1] Step outside into blowing snow, freezing fog, 45 mph winds with hurricane-force gusts, and a −50° Fahrenheit windchill. Welcome to a typical January day at the

Mount Washington Observatory. [A] Weather conditions at this facility, which sits atop its <1> namesake's 6,288-foot peak in New Hampshire, has earned <2> the location the nickname "Home of the World's Worst Weather."

[§2] [B] Though somewhat diminutive compared to other mountains, (Colorado's Pikes Peak, <3> for example, is more than twice its height), Mount Washington is the tallest peak in the Presidential Range. <4> The peak stands at the confluence of three major storm tracks, and its steep slopes force <5> rising winds to accelerate. In fact, scientists in 1934 recorded a surface wind speed (of 231 mph): <6> one of the fastest ever recorded.

[§3] In one study, researchers used a laser beam and advanced optical techniques to measure winds. The observatory also keeps detailed weather records that scientists have used to track climate trends and weather patterns. The <7> observatory has also advanced scientists' understanding of clouds, of ice physics, <8> and the atmosphere.

[§4] To conduct all this research, staff are on-site year-round. Observers, who work <9> several twelve-hour shifts over the course of a week. To change personnel in winter, though, <10> crews ascend the mountain in a vehicle, gripping <11> the snow using revolving tracks similar to those on a military tank. Observers go outside every hour to gather data, which they send to the

National Weather Service. [C]

[§5] Though isolated, the Mount Washington Observatory offers weather enthusiasts many ways to get involved. The observatory takes volunteers and accepts interns, who assist with research. The <12> bold can take part in educational trips to the summit in winter. [D] For those who are planning to make a trip to Mount Washington, <13> the observatory has a website with live video feeds of the summit.

<6>:

A. NO CHANGE

B. speed of 231 mph –

C. speed of 231 mph;

D. speed, of 231 mph,

ANSWER: B

Explanation:

The correct revision is *speed of 231 mph* –, producing the sentence "scientists in 1934 recorded a surface wind speed of 231 mph—one of the fastest ever recorded." Here, the phrase after the dash adds a closely related explanatory comment about the significance of the measured wind speed. The first part of the sentence is already complete: scientists recorded a particular speed. The following words, "one of the fastest ever recorded," do not introduce an independent clause; instead, they emphasize and characterize that record. A dash is an effective punctuation choice for this kind of emphatic, informative interruption, especially in a concise science passage intended for a general audience. The revision also removes the unnecessary parentheses around "of 231 mph," allowing the exact measurement to remain integral to the noun phrase "surface wind speed of 231 mph." This makes the sentence direct, grammatically smooth, and appropriately energetic in tone. ACT English questions assess conventions of standard written English as well as choices that preserve clarity and rhetorical effectiveness; see ACT test-preparation resources. For a summary of standard dash use to set off an explanatory or emphatic addition, see the Purdue OWL dash guidance.

QUESTION NO: 62

Should Churches Be Taxed? Pros and Cons http://churchesandtaxes.procon.org

'PRO' PASSAGE

(1) Exempting churches from taxation upholds the separation of church and state embodied by the Establishment Clause of the First Amendment of the US Constitution. The US Supreme Court, in a majority opinion written by Chief Justice Warren

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”

(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”

(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.

(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”

(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren

E. Burger in his majority opinion in Walz

v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”

(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.

'CON' PASSAGE

(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”

(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.

(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.

(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”

(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

H. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."

(12) The tax code makes no distinction between authentic religions and fraudulent startup “faiths,” which benefit at taxpayers’ expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties. In Mar. 2004, the IRS warned of an increase in schemes that “exploit legitimate laws to establish sham one-person, nonprofit religious corporations” charging $1,000 or more per person to attend “seminars.” The Church of Scientology, which TIME Magazine described in May 1991 as a “thriving cult of greed and power” and “a hugely profitable global racket,” was granted federal income tax exemption in Oct. 1993. The New York Times reported that this “saved the church tens of millions of dollars in taxes.”

This question pertains to the “CON” portion of the passage. Choose the answer that best completes the following question.

Associate Justice of the US Supreme court, William O. Douglas, writes in his dissenting opinion about how nonbelievers deserve the same “protection by the articles of their faith” as believers.

What statement most clearly states his meaning?

A. Nonbelievers are in grave danger when offering churches tax exempt status.

B. If tax exemption signifies protection based on belief, then nonbelief is also a form of belief, and thus deserves the same protections. By offering tax exemption to one group and not the other, the state is discriminating.

C. Tax exempt status separates real charities from those just trying to evade their taxes.

D. None of the above.

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”
(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”
(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.
(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”
(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren
Burger in his majority opinion in Walz
v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”
(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.
'CON' PASSAGE
(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”
(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.
(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.
(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion

are taxed to make up the deficit in the public income thus caused."
(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

F. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."
(12) The tax code makes no distinction between authentic religions and fraudulent startup "faiths," which benefit at taxpayers' expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties. In Mar. 2004, the IRS warned of an increase in schemes that "exploit legitimate laws to establish sham one-person, nonprofit religious corporations" charging $1,000 or more per person to attend "seminars." The Church of Scientology, which TIME Magazine described in May 1991 as a "thriving cult of greed and power" and "a hugely profitable global racket," was granted federal income tax exemption in Oct. 1993. The New York Times reported that this "saved the church tens of millions of dollars in taxes."
This question pertains to the "CON" portion of the passage. Choose the answer that best completes the following question.
Associate Justice of the US Supreme court, William O. Douglas, writes in his dissenting opinion about how nonbelievers deserve the same "protection by the articles of their faith" as believers.
What statement most clearly states his meaning?

ANSWER: B

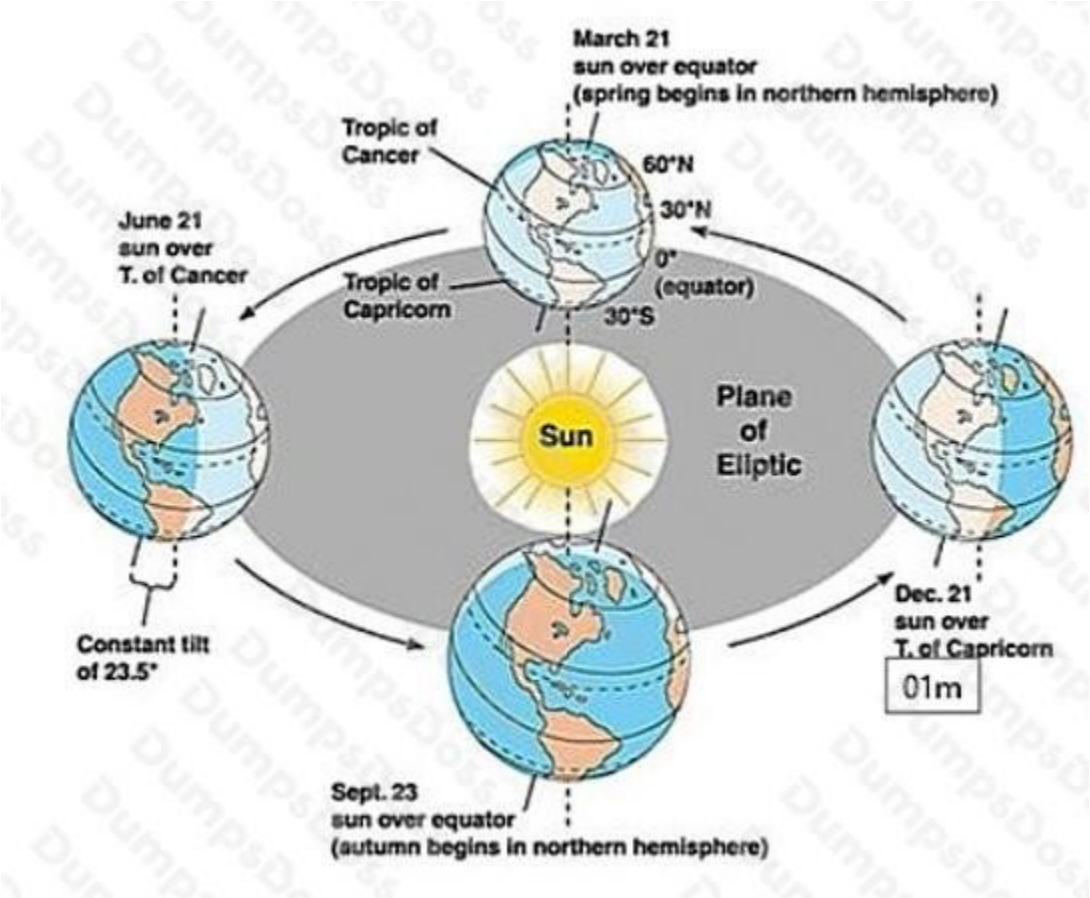
Explanation:

If tax exemption signifies protection based on belief, then nonbelief is also a form of belief, and thus deserves the same protections. By offering tax exemption to one group and not the other, the state is discriminating. This most clearly captures Douglas's stated concern that believers and nonbelievers are treated differently because of their respective positions regarding faith. In his *Walz* dissent, Douglas reasoned that a tax exemption provides a public financial benefit to religious believers and institutions. If government provides that benefit on the basis of religious belief, fairness requires equivalent treatment for nonbelievers rather than a legal preference for religion. The answer accurately restates the passage's central point: the distinction is not merely about a church's administrative tax status, but about unequal governmental treatment tied to belief or nonbelief. Douglas concluded that this unequal treatment rendered the exemption unconstitutional under his understanding of the Establishment Clause. The Supreme Court's majority ultimately upheld the exemption, but Douglas's dissent advances the equality-based principle summarized in this answer. The full decision, including the dissent, is available at Justia's Walz v. Tax Commission of the City of New York page. The First Amendment's religion clauses are reproduced by the Constitution Annotated.

QUESTION NO: 63

Excerpt from https://schoolworkhelper.net/the-effect-of-the-earth's-rotation-revolution/

THE EFFECT OF THE EARTH'S ROTATION & REVOLUTION



(1) When watching the stars at night, they do appear to move very slowly. This is because the Earth is constantly moving. The Earth completes one “rotation” every twenty-four hours. A rotation iswhen the planet spins around once. The Earth rotates counterclockwise; this is why the Sun “rises” in the East and “sets” in the West. It is not the Sun’s movement that causes days, but rather the Earth turning around in front of the Sun. The Earth’s axis (the point at which it rotates around, for example, if you were to spin around while standing in one spot, your axis would be an imaginary line running through your head straight down to your feet) is in line with a star named “Polaris”. Polaris is also known as the “North Star” since it is directly above the Earth’s axis. Since this star is directly above the Earth’s axis, it does not appear to move, however the rest of the stars in the sky move around Polaris (for example: when you spin around, the object directly above your head does not appear to move but everything else seems to spin around that object). Polaris is only seen in the Northern hemisphere and it belongs to the Little Dipper constellation (it’s the last star at the end of the “handle”).

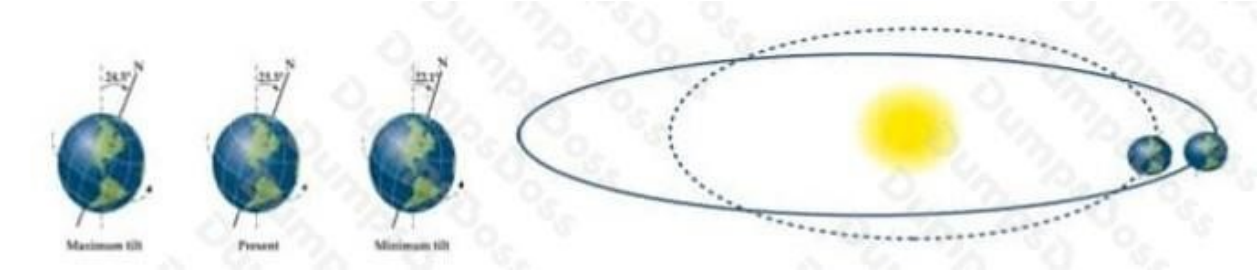
THE EFFECT OF THE EARTH’S REVOLUTION

(2) Another type of motion is known as “revolution”. Revolution is when one object completes a circular path around another object. The Earth takes 365.24 days to revolve around the Sun. Thisis why a year is 365 days long. During the year the Earth is angled differently towards the Sun. These changing angles provide us with different Sun intensities and therefore we get four different seasons. Since the Earth is at different positions in space over the year, we see different constellations throughout the year.

(3) Earth is currently in a cool phase characterized by formation of glaciers (glacial maxima), followed by warm periods with glacial melting (interglacial periods). These glacial-interglacial cycles occur at frequencies of about 100,000 years. We are currently in an interglacial period; these have lasted about 23,000 years in the past. The last glacial maximum was about 18,000 years ago.

(4) The glacial-interglacial cycles have been explained by regular changes in the shape of Earth’s orbit and the tilt of its axis – Milankovitch cycles.

(5) Circular rotation causes glaciers to melt; more solar radiation; Elliptical = less radiation. The intensity of solar radiation reaching Earth changes, resulting in climatic change. The shape ofEarth’s orbit changes in 100,000-year cycles. The angle of axis tilt changes in cycles of about 41,000 years. Earth’s orientation relative to other celestial objects changes in cycles of about 22,000 years.



THE EFFECT OF PLANET'S MOTION

(6) Thousands of years ago, people were able to clearly see the night sky (no "light pollution"). The one thing they noticed is that five "stars" seemed to wander faster through the night sky thanother stars. These "stars" were actually the planets Mercury, Venus, Mars, Jupiter, and Saturn. People called these objects "wandering stars". Their names were then changed to planets which is after the Greek word "planetes" which means "wanderers". All planets rotate on their axes and revolve around the Sun, however these times are different for each planet. Planets move through constellations as well. This motion usually takes a few weeks. Many constellations are named after animals. The Greek word for "animal sign" is "zodion". This is why we have star groups called the zodiac constellations. Depending on which zodiac constellation was visible when you were born is the "sign" you have been assigned. For example: Aquarius, Leo, Gemini, Sagittarius, etc. Many people believe that zodiac signs determine certain traits and characteristics of people. This is known as "astrology" and is not a legitimate science based on truth or facts. Astrology is simply for entertainment.

REVOLUTION AROUND THE SUN VS. ROTATION UPON AXIS

(7) Revolve, as in orbiting the Sun? Yes, all the planets in our solar system orbit the Sun in the same direction Earth does. Some comets and asteroids orbit backwards, and some (more socomets than asteroids) orbit virtually perpendicular to the plane of Earth's orbit.

(8) Rotate, as to spin on ones axis (the thing that causes day and night on Earth)? Earth rotates counter-clockwise, as seen from above Earth's north pole, the same direction it revolves aroundthe Sun. But two planets (used to be 3, when Pluto was a planet) rotate clockwise – Venus and Uranus. Some might quibble about Uranus, as it spins on its side, but technically it rotates clockwise.

(9) Why do they all revolve in the same direction, and most rotate in the same direction? Because of the way the solar system formed. It formed out of a nebula – a giant cloud of gas and dust inspace. This cloud had a slight rotation to it. Gravity caused the dust and gas to come together, but since the nebula was spinning, it collapsed into a disk instead of a sphere. The center of the disk, that's where the Sun formed. The rest of the disk (now rotating quite nicely) is where the planets formed. So all the planets revolve in the same direction because that's the direction the original nebula was rotating.

(10) Why do some planets now rotate backward? They got clobbered by one or more large asteroids while they were forming, which caused their rotation rate/direction to change. Earth gotclobbered, too, at least once – that's how we got our Moon!

The term "glacial maxima" best refers to which of the following?

A. The formation of glaciers.

B. The melting of glaciers.

C. The warming of glaciers.

D. The earth's warm phase.

ANSWER: A

Explanation:

"The formation of glaciers." is correct because the passage directly defines the term in paragraph 3: it describes a cool phase "characterized by formation of glaciers (glacial maxima)." Thus, in the context of this question, glacial maxima refers to the colder portions of long-term climate cycles in which ice sheets and glaciers grow. More precisely in Earth science, a glacial maximum is the interval when global ice volume and the extent of ice sheets reach their greatest levels during a glacial period. The phrase therefore signals maximum glaciation: extensive accumulation of ice, generally associated with lower global temperatures and lower sea levels. The passage contrasts this state with later warm interglacial periods, during which glacial melting occurs. This context confirms that the intended meaning is glacier formation and expansion, rather than a warm interval. The National Park Service describes the Last Glacial Maximum as the time when ice sheets were at their

greatest extent, and the National Snow and Ice Data Center likewise identifies it as a period of maximum global ice volume. See the National Park Service overview of the Last Glacial Maximum and the National Snow and Ice Data Center's explanation of ice sheets.

QUESTION NO: 64

Why Has Single Motherhood Increased?

(1) Changes in children's living arrangements result from long-standing trends in marriage, divorce, and fertility. Divorce rates in the United States have been going up since the turn of thecentury and have recently stabilized at very high levels. Out-of-wedlock birth rates have been going up gradually since at least the early 1940s. After 1960, the age of women at their first marriages began to rise, increasing the proportion of young women who might become unwed mothers. Together, these forces have fueled the growth of single parenthood during the postwar period.

(2) These trends exist in all western, industrialized countries. Divorce rates more than doubled in most countries between 1960 and 1990; in some they increased fourfold. Single parenthood alsoincreased in nearly all western countries between 1970 and the late 1980s. Yet the U.S. has the highest prevalence of single-parent families, and it has experienced the largest increase between 1970 and 1990.

(3) In the view of conservatives, welfare benefits in the United States have reduced the costs of single motherhood and discouraged young men and women from marrying. In some parts of thecountry, welfare may provide poor women with more economic security than marriage does. However, for three reasons, the argument that welfare caused the growth in single-parent families does not withstand scrutiny.

(4) The trend in welfare benefits between 1960 and 1990 does not match the trend in single motherhood. Welfare and single motherhood both increased dramatically during the 1960s and early1970s. After 1974, however, welfare benefits declined, but single motherhood continued to rise. The real value of the welfare benefit package (cash assistance plus food stamps) for a family of four with no other income fell from $10,133 in 1972 to $8,374 in 1980 and to $7,657 in 1992, a loss of 26 percent between 1972 and 1992 (in 1992 dollars).

(5) Increases in welfare cannot explain why single motherhood grew among more advantaged women. Since 1960, divorce and single parenthood have grown among women with a collegeeducation, who are not likely to be motivated by the promise of a welfare check.

(6) Welfare payments cannot explain why single motherhood is more common in the United States than in other industrialized countries. Nearly all the Western European countries have muchmore generous payments for single mothers than the U.S., yet the prevalence of single motherhood is lower in these countries. One way to compare the "costs" of single motherhood in different countries is to compare the poverty rates of single mothers with those of married mothers. While single mothers have higher poverty rates than married mothers in all industrialized countries, they are worst off in the United States.

(7) If welfare is not to blame, what is? Three factors seem to be primarily responsible.

(8) The first is the growing economic independence of women. Women who can support themselves outside marriage can be picky about when and whom they marry. They can leave badmarriages and they can afford to bear and raise children on their own. Thus, single mothers will be more common in a society where women are more economically independent, all else being equal.

(9) American women have moved steadily toward economic independence throughout this century thanks to increased hourly wages, greater control over child-bearing, and technologicaladvances that reduce time required for housework. Since the turn of the century, each new generation of young women has entered the labor force in greater proportions and stayed at work longer. By 1970, over half of all American women were employed or looking for work; by 1990, nearly three quarters were doing so. The rise in welfare benefits during the 1950s and 1960s may have made poor women less dependent on men by providing them with an alternative source of economic support. However, welfare was only a small part of a much larger change that was enabling all women, rich and poor alike, to live more easily without a husband.

(10) A second factor in the growth of single motherhood is the decline in men's earning power relative to women's. After World War II and up through the early 1970s, both men and womenbenefitted from a strong economy. While women were becoming more self-sufficient during the 1950s and 1960s, men's wages and employment opportunities were increasing as well.

Consequently, while more women could afford to live alone, the economic payoff from marriage continued to rise. After 1970, however, the gender gap in earnings (women's earnings divided by men's earnings) began to narrow. In 1970, female workers earned 59 percent as much as male workers; by 1980, they earned 65 percent as much and by 1990 74 percent.

(These numbers, which come from a study by Suzanne Bianchi to be published by the Russell Sage Foundation, are based on full-time workers between the ages of 25 and 34.) In just two short decades, the economic payoff from marriage had declined by 15 percentage points. Such reductions are likely to increase single motherhood.

(11) The narrowing of the wage gap occurred among adults from all social strata, but the source of the narrowing varied. Among those with a college education, men were doing well, but womenwere doing even better. Between 1980 and 1990, the earnings of college-educated women grew by 17 percent, while the earnings of college-educated men grew by only 5 percent. (Again, I am referring to full-time workers, aged 25 to 34). Thus, even though the benefits of marriage were declining, women still had much to gain from pooling resources with a man.

As it is used at the end of paragraph 3, the word “scrutiny” most nearly means:

A. ignorance

B. investigation

C. conformity

D. contrast

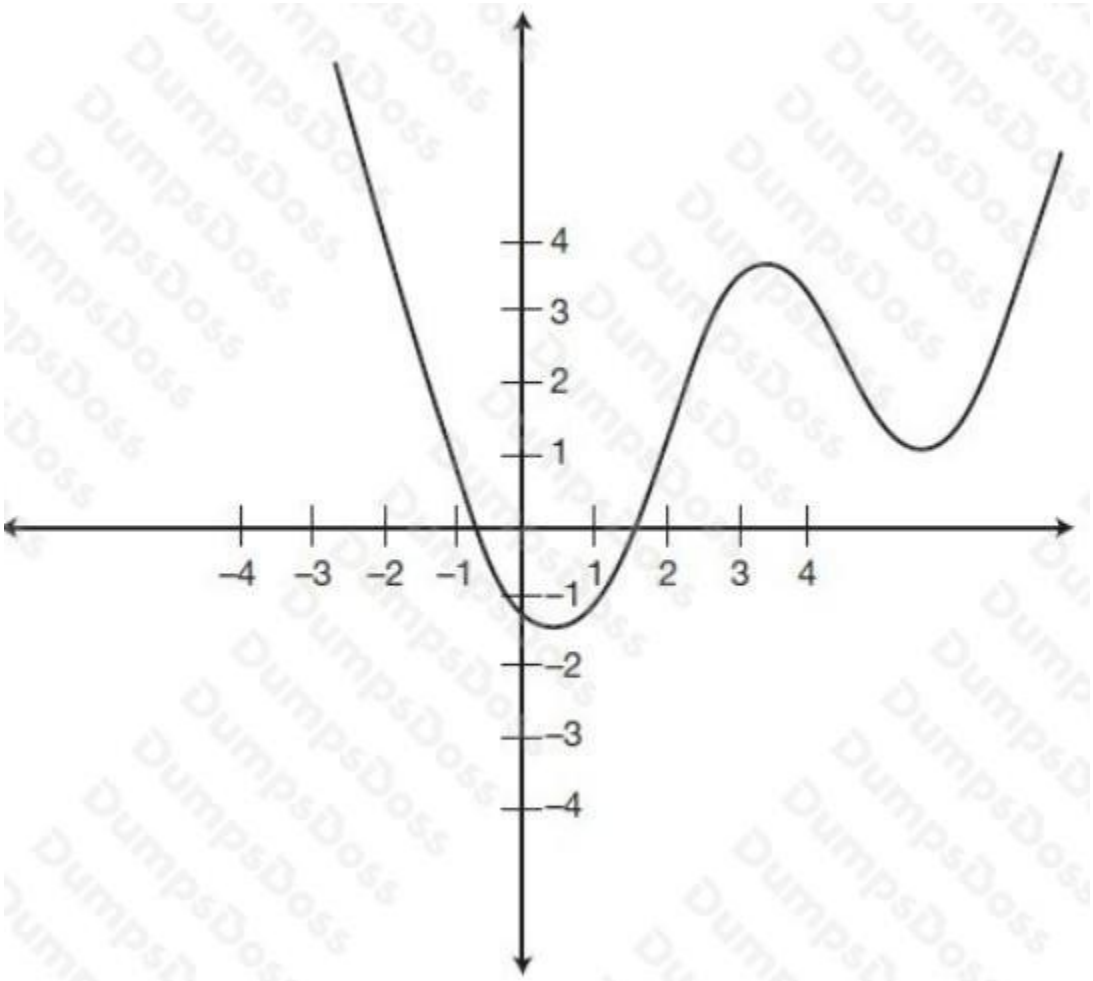
ANSWER: B

Explanation:

“Investigation” is correct because, in context, “scrutiny” means careful and critical examination. The author introduces a claim that welfare caused growth in single-parent families, then states that this claim “does not withstand scrutiny.” The following paragraphs conduct that examination by considering evidence about trends in welfare benefits, the increase in single motherhood among college-educated women, and comparisons with other industrialized countries. Thus, the passage uses “scrutiny” to describe a close investigation or evaluation of whether the stated causal claim is supported by evidence.

This meaning aligns with standard dictionary definitions. Merriam-Webster defines “scrutiny” as “a searching study, inquiry, or inspection,” and Cambridge Dictionary similarly defines it as the careful and detailed examination of something to obtain information or discover whether it is acceptable. In the sentence, the claim fails when subjected to that kind of searching inquiry. The surrounding structure is especially important: “for three reasons” signals that the author will test the argument systematically, making “investigation” the most precise match for the word’s intended meaning. See Merriam-Webster’s definition of scrutiny and Cambridge Dictionary’s definition of scrutiny.

QUESTION NO: 65



In the diagram above of f(x), for how many values does f(x) = −1?

A. 0

B. 1

C. 2

D. 3

E. 4

ANSWER: C

Explanation:

The correct answer is **2**. The equation *f(x) = −1* asks for the number of input values, or x-values, at which the function's output has a y-value of −1. On a graph, this is found by considering the horizontal line *y = −1* and counting its intersection points with the graph of *f*. The displayed curve intersects that horizontal level twice. Each intersection corresponds to one distinct x-value whose function value is −1, so there are two such values. This interpretation reflects the standard relationship between a function's graph and its equation: a point on the graph has coordinates (x, f(x)), and solving an equation such as *f(x) = c* means locating every point whose vertical coordinate is c. ACT mathematics questions commonly assess the ability to interpret functions from graphs and connect graphical points to function notation. For additional guidance on interpreting functions and their graphs, see OpenStax College Algebra: Functions and Function Notation and the ACT test-preparation resources.

QUESTION NO: 66

A rectangle with a perimeter of 30 centimeters is twice as long as it is wide. What is the area of the rectangle in square centimeters?

A. 20

B. 30

C. 40

D. 50

ANSWER: D

Explanation:

The correct answer is **50**. Let the width be *w* centimeters. Because the rectangle is twice as long as it is wide, its length is *2w*. A rectangle's perimeter is found by adding both lengths and both widths, expressed by the formula *P = 2l + 2w*. Substituting the known perimeter and the relationship between length and width gives *30 = 2(2w) + 2w*. Combining like terms yields *30 = 6w*, so the width is 5 centimeters. The length is twice that amount, or 10 centimeters. Area is calculated by multiplying length by width: *A = l × w*. Thus, the area is *10 × 5 = 50* square centimeters. This result is also consistent with the stated perimeter, since the four sides total *10 + 10 + 5 + 5 = 30* centimeters. For a review of rectangle area and perimeter formulas, see Math is Fun: Rectangle and Khan Academy: Perimeter review.

QUESTION NO: 67

From How to Break Your Addiction to a Person by Howard Halpern

(1) Eileen is an attractive and talented twenty-eight-year-old editor of a woman's magazine. She had come to see me for psychotherapy because her physician had told her that her skin rashesand difficulty sleeping were emotional in origin. For the past two years she had been involved with Peter, a dynamic and successful architect, and it was during this time that her symptoms had developed. It was easy to see why. At best, Peter treated her badly. Often, he was cruel. And Eileen would put up with his treatment. They would have a date, and he'd fail to show up. Then he might call about 2 a.m., make a weak excuse, and tell her to "grab a cab and come over." And she would get out of bed, dress, and take a taxi to his apartment.

(2) In one session Eileen came in glowing because Peter, uncharacteristically, had asked her to go away with him to a resort for the weekend. But at the next session she was depressed andbitter. As they were on their way to what she had believed would be a romantic holiday, Peter informed her that he would be attending a business conference and that she would be alone most of the time. She had been furious, she yelled at him and cried, but, as so often before, he just accused her of being too demanding. When they returned from the weekend, she told him that she couldn't take it anymore and that she didn't want to see him again. He shrugged and left. In less than a week, in five days of agony, sleeplessness, despair, and a blotchy rash, she found herself dialing his number, willing to go back on the most humiliating terms. "It's like something takes hold of me," she cried.

(3) What is it that takes hold of her? Why does this capable and otherwise rational woman remain so intensely involved with a man who is consistently rejecting, who repeatedly causes her pain?Why, when she tries to give up this relationship, does she experience even more acute torment?

ADDICTION TO A PERSON

(4) Looked at closely, Eileen's attachment to Peter has all the characteristics of an addiction. I am not using the term "addiction" symbolically or metaphorically. Not only is it possible but it isextremely common for one person in a love relationship to become addicted to the other. Stanton Peele, in his book Love and Addiction, recognized the addictive nature of some love relationships. Reviewing many studies of drug addiction, he noted a frequent conclusion – that the addicting element is not so much in the substance (such as alcohol or tobacco or a narcotic) but in the person who is addicted. In love relationships, this addictive element takes the form of a compelling need to connect with and to remain connected with a particular person. But is this need always an addiction? Why call it an addiction at all? Why not simply call it love or preference or a sense of commitment?

(5) Often there is a lot of love and commitment in an addictive relationship, but to be genuinely loving and committed one must freely choose another person, and one of the hallmarks of anaddiction is that it is a compulsive drive which, by definition, means that it limits this freedom. The alcoholic or drug addict feels driven toward the addictive substance even when he knows it is bad for him. And when there is a strong addictive element in a relationship, the feeling is "I must have this person, and I must remain attached to this person, even if this relationship is bad for me."

(6) So, the first indication that we are dealing with an addiction is its compulsive quality. The second is the panic one feels at the possible absence of the substance. Alcoholics often feel panicwhen they are not sure where the next drink is coming

from. Drug addicts experience this fear when their supply of drugs is running out. Nicotine addicts may become very uneasy about being in a place where smoking is not permitted. And people in an addictive relationship may experience overwhelming panic at the thought of breaking the relationship. I have often heard of people sitting at the telephone and beginning to dial the number of their partner in an unhappy love affair, determined to tell him or her that it is all over, but their anxiety becomes so great they have to hang up.

(7) The third hallmark of an addiction is the withdrawal symptoms. As bad as the panic is in contemplating or moving toward a possible breakup, it cannot compare to the devastation when thebreakup actually happens. A person who has just ended an addictive relationship may suffer greater agony than drug addicts, smokers, and alcoholics endure when they go cold turkey, and in many ways the reaction is similar. Often, for example, there is physical pain (the chest, stomach, and abdomen are particularly reactive), weeping, sleep disturbances (some people can't sleep, others may sleep too much), irritability, depression, and the feeling that there is no place to go and no way to end the discomfort except to go back to the old substance (person). The craving can become so intense it often defeats the sufferer's best intentions and drives him right back to the source of his addiction.

(8) The fourth hallmark of an addiction is that after the mourning period, there is often a sense of liberation, triumph, and accomplishment. This differs from the slow, sad acceptance and healingthat follows a non-addictive loss.

(9) Underlying all these reactions, the essential similarity between addicts, whether their addiction is to a substance or a person, is a sense of incompleteness, emptiness, despair, sadness, andbeing lost that he believes he can remedy only through his connection to something or someone outside himself. This something or someone becomes the center of his existence, and he is willing to do himself a great deal of damage to keep his connection with it intact.

(10) If we look back at Eileen's tie to Peter, we can see many of the signs of addiction. She feels compelled to be in contact with him, she panics when she thinks about ending it, and has intenseand agonizing withdrawal symptoms, including physical disturbances from which she can only find immediate relief by reestablishing a connection with him. And despite her considerable accomplishments and her many appealing qualities, she has serious doubts about whether she is within herself a complete, adequate, and lovable person if she is without her connection to Peter.

How does the author know Eileen is addicted to Peter?

A. She thinks of him and their relationship often.

B. She writes about it a lot for her magazine.

C. She exhibits many of the same behaviors and reactions as a person addicted to drugs or alcohol.

D. She is drawn in by the respect that Peter shows to her.

ANSWER: C

Explanation:

"She exhibits many of the same behaviors and reactions as a person addicted to drugs or alcohol" is correct because the author explicitly defines addiction through observable hallmarks and then applies those hallmarks directly to Eileen's relationship with Peter. In the final paragraph, the author identifies her compulsive need to contact him, her panic at the prospect of ending the relationship, and her severe withdrawal-like symptoms—agony, sleeplessness, despair, and physical disturbances—after she tries to leave. Her return to Peter despite his mistreatment further demonstrates the compulsive pattern the passage associates with addiction.

The passage's reasoning is evidence-based: it first establishes a comparison between substance addiction and addiction to a person, then shows that Eileen displays the same cycle of craving, distress during separation, and relief when contact is restored. This is a reading-comprehension inference question, so the best answer must synthesize the author's stated evidence rather than focus on a single incidental fact about Eileen or Peter. ACT Reading questions assess the ability to identify central claims and support them with details from the passage; see the ACT test description and the ACT preparation resources.

QUESTION NO: 68

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Lightning in the Sand

[§1] As my friend Anna and I walked the sand dunes of southeastern New Mexico, she told me that she hoped we'd find a fulgurite, one as translucent white as the southeastern New Mexico sands around us. <1> A fulgurite – whose name stems from the Latin word fulgur, which means "thunderbolt" – is a hollow silica glass tube formed when lightning strikes sand. A fulgurite is created in one explosive second by fusion and pressure as sand heated by a lightning blast melts, <2> and becomes glass. Commonly called "petrified lightning," a fulgurite places <3> the shape of a miniature lightning bolt into the earth, often branching deep into the ground.

[§2] Anna told me that I had possibly seen a small fragment of a fulgurite before, without realizing I had, on a beach. She explained though that even experts <4> are rarely able to locate a fully intact fulgurite. The thin, brittle glass tubes break easily. <5> Occasionally, after strong, sustained winds have shifted desert sands, while <6> an unbroken, previously buried fulgurite will be revealed, showing as a tube protruding from the ground. <7> I scanned the area, hopeful that I'd see a tube newly uncovered. <8> Anna made clear that we'd be lucky to come upon a small piece of fulgurite, just a few inches long.

[§3] Anna had shown me fulgurites she had found on other trips. Their colors ranged from black to brown to green, corresponding to the color of the sand in which she had discovered them. I wasn't surprised that I'd never recognized fulgurites on any beach: no one had ever told me what to look for <9> Their interiors, though, are smooth, clear glass stained <10> with tiny bubbles trapped formed by air and moisture <11> during the rapid cooling of the melted sand after the lightning strike.

[§4] We continued exploring the dunes. Anna laughed and said we needed only to stop at the local gift shop to unearth <12> our treasure. <13> But given our <14> luck finding fulgurites in deserts and on beaches, <15> she wanted to keep searching to find our own piece of bright, white lightning in the sand.

The best placement for the underlined portion <11> would be:

A. where it is now.

B. after the word bubbles.

C. after the word during.

D. after the word cooling.

ANSWER: B

Explanation:

"After the word bubbles." is the best placement because it creates a clear, logical modifier sequence: the glass is stained with "tiny bubbles formed by air and moisture trapped during the rapid cooling of the melted sand." In this construction, "formed" immediately identifies what the bubbles did, while "by air and moisture" explains the material or conditions involved in their formation. The phrase "trapped during the rapid cooling" then most naturally modifies "air and moisture," specifying when those substances became enclosed as the melted sand cooled into glass. Placing the participle close to the noun it describes is an important editing principle because readers should not have to pause and reconstruct the intended relationship among the words. Here, positioning "formed" directly after "bubbles" ensures that the sentence accurately describes the physical process and preserves the passage's precise, informative scientific tone. ACT English questions assess whether a revision improves sentence structure, clarity, and conventional written English; see the ACT's Preparing for the ACT guide. For additional guidance on keeping modifiers close to the words they modify, consult the Purdue OWL overview of modifiers.

QUESTION NO: 69

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Bicycles

[§1] (1) Today, bicycles are so common that it's hard to believe they haven't always been around. (2) But two hundred years ago, bicycles weren't even existing, <1> and the first bicycle, invented in Germany in 1818, was nothing like our bicycles today – it was made of wood and didn't even have pedals. (3) Since then, however, numerous innovations and

improvements in design have made the bicycle one of the most popular means of recreation and transportation around the world.

[§2] (4) In 1839, Kirkpatrick Macmillan a Scottish blacksmith, <2> dramatically improved upon the original bicycle design. (5) Macmillan's machine had tires with iron rims to keep them from getting worn down. (6) He also used foot-operated cranks similar to pedals so his bicycle could be ridden at a quick pace. <3> (7) It hadn't looked <4> much like a modern bicycle, though, because its back wheel was substantially larger than its front wheel. (8) In 1861, the French Michaux brothers took the evolution of the bicycle a step further by inventing an improved crank mechanism.

[§3] (9) Ten years later, James Starley, an English inventor, revolutionized bicycle design. (10) He, made <5> the front wheel many times larger than the back wheel, putting a gear on <6> the pedals to make the bicycle more efficient, and lightened the wheels by using wire spokes. (11) Although this bicycle was much lighter and less tiring to ride, it was still clumsy, extremely topheavy, and ridden mostly for entertainment.

[§4] (12) It wasn't until 1874 that the first truly modern bicycle appeared on the scene. (13) Today their built, <7> used, and enjoyed all over the world. (14)

H. J. Lawson, invented by another Englishman, <8> the "safety bicycle" would look familiar to today's cyclists. (15) This bicycle had equal sized wheels, which made it less prone to toppling over. (16) Lawson also attached a chain to the pedals to drive the rear wheel. (17) With these improvements, the bicycle became extremely popular and useful for transportation.

<2>:

A. NO CHANGE

B. Macmillan was a Scottish blacksmith

C. Macmillan, a Scottish blacksmith,

D. Macmillan, he was a Scottish blacksmith,

E. J. Lawson, invented by another Englishman, <8> the "safety bicycle" would look familiar to today's cyclists. (15) This bicycle had equal sized wheels, which made it less prone to toppling over. (16) Lawson also attached a chain to the pedals to drive the rear wheel. (17) With these improvements, the bicycle became extremely popular and useful for transportation. <2>:

ANSWER: C

Explanation:

Macmillan, a Scottish blacksmith, is correct because "a Scottish blacksmith" is a nonessential appositive: it supplies additional biographical information about the already identified person, Kirkpatrick Macmillan, but it is not necessary to identify whom the sentence means. The name "Kirkpatrick Macmillan" independently identifies the subject, while the appositive simply adds a descriptive detail. Standard written English sets off this type of nonrestrictive information with a comma before it and a comma after it. With the revision, the complete sentence reads smoothly: "In 1839, Kirkpatrick Macmillan, a Scottish blacksmith, dramatically improved upon the original bicycle design." The commas signal that the main assertion concerns Macmillan's improvement of the bicycle, while his occupation is supplementary context. This punctuation also maintains the passage's factual, explanatory tone by incorporating the historical detail efficiently without interrupting the grammatical structure of the sentence. Guidance on commas with nonessential appositives is available from the Purdue Online Writing Lab and the Grammarly guide to appositives.

QUESTION NO: 70

A chemist performed two experiments. The chemist had the objective of determining the melting points and boiling points of multiple elements. When an element reaches its Melting Point or Boiling Point, its state of matter changes. A solid object heated to its Melting Point becomes a liquid, and if further heated to its Boiling Point it becomes a gas. If a gas is cooled to its Boiling Point it will transition back to a liquid, and if cooled further to its Melting Point it will transition back to a solid.

In Experiment 1, the chemist gathered eight elements and stored them each individually at temperatures that allowed them to exist in their solid state. Following this, the chemist heated each element and recorded the temperature at which melting occurred. The results are shown in Figure 1.

Element	Melting Point (Celsius)
Hydrogen	-259.16
Magnesium	650
Argon	-189.34
Oxygen	-218.79
Phosphorus	44.15
Lithium	180.5
Sodium	97.79
Barium	727

Figure 1

In Experiment 2, the chemist stored each of the eight elements used in Experiment 1 at temperatures that allowed them to exist in their liquid state. Following this, the chemist heated each element and recorded the temperature at which boiling occurred. The results are shown in Figure 2.

Element	Boiling Point (Celsius)
Hydrogen	-252.87
Magnesium	1090
Argon	-185.85
Oxygen	-182.96
Phosphorus	280.5
Lithium	1342
Sodium	882.94
Barium	1845

Figure 2

If each element were returned to its state at room temperature (23 degrees Celsius), how many elements would be liquid?

A. 3

B. 5

C. 8

D. 0

ANSWER: D

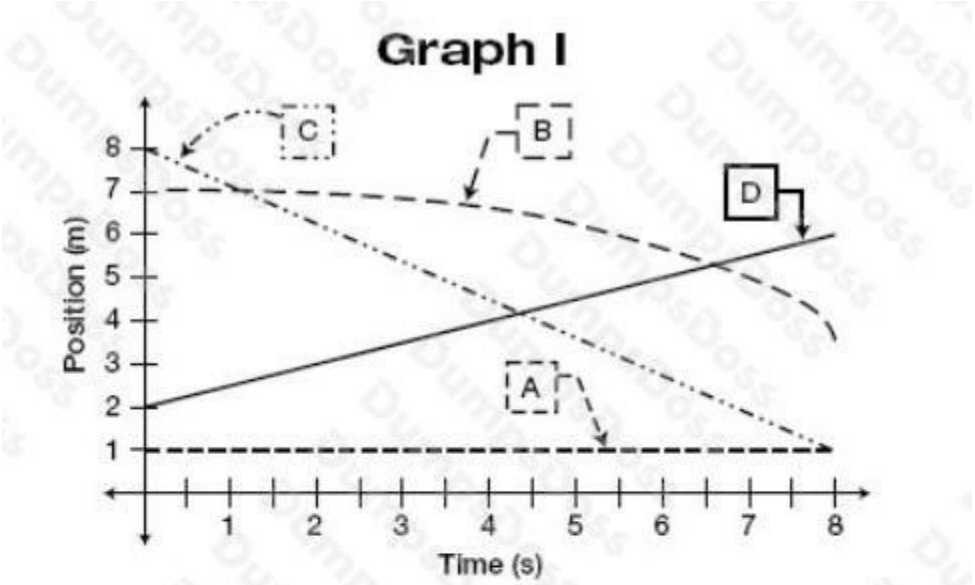
Explanation:

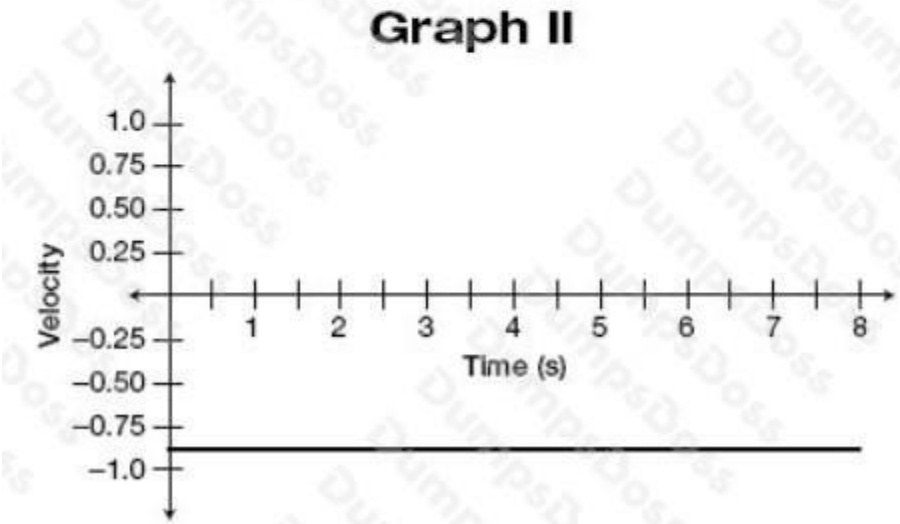
0 is correct. At a stated temperature, an element is liquid only when that temperature falls between its melting point and boiling point (assuming the same pressure conditions used for the observations). Thus, 23°C would have to be higher than an element's melting point, so that it is no longer solid, and lower than its boiling point, so that it has not become a gas. Using the melting-point data first identifies the elements that could possibly be liquid at 23°C: only those whose melting points are below 23°C. The boiling-point data then resolves their state. For each of those remaining elements, the recorded boiling point is also below 23°C. Because room temperature is above its boiling point, each such element would be gaseous rather than liquid. The other elements have melting points above 23°C and therefore remain solid at room temperature. Consequently, none of the eight elements has a melting point below 23°C and a boiling point above 23°C, which is the required range for a liquid at room temperature. This reasoning applies the standard phase-change definitions summarized

by NIST's temperature reference and the phase-transition terminology used in the IUPAC Gold Book definition of boiling point.

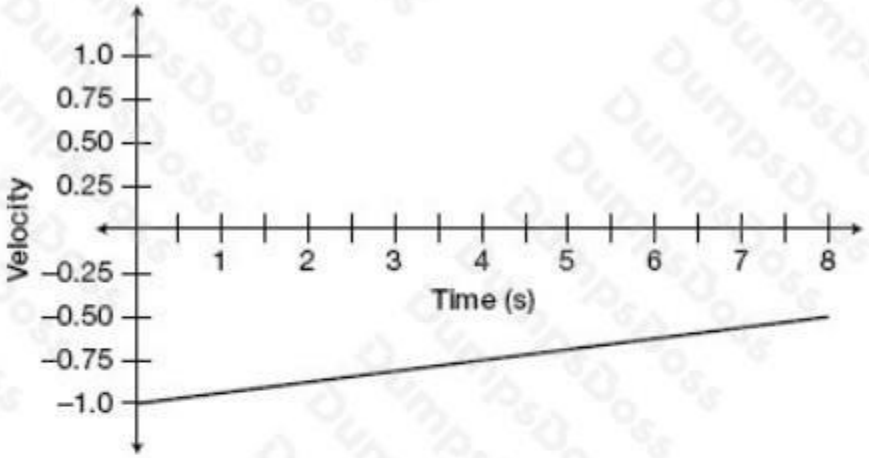
QUESTION NO: 71

Graphs I-IV and Data Table I represent the motion of objects in one dimension as detected by a motion detector. Motion in the positive direction represents motion away from the motion detector and motion in the negative direction represents motion toward the motion detector.

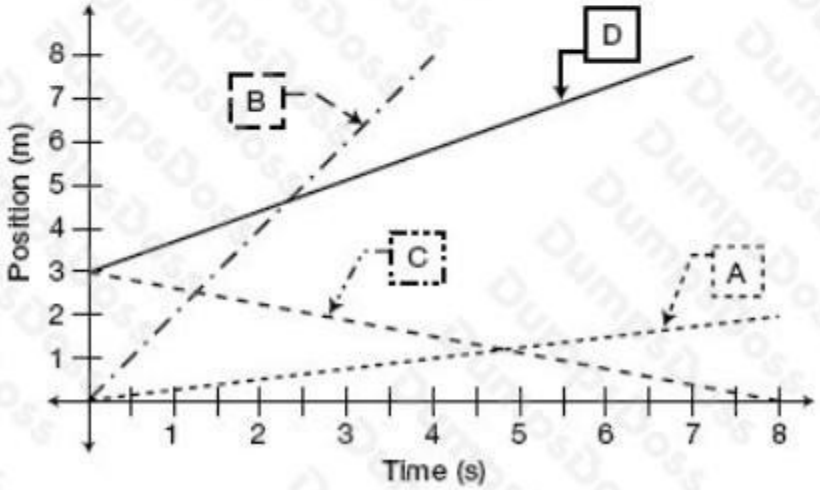




Graph III



Graph IV



DATA TABLE 1

TIME (S)	VELOCITY (M/S)
0.00	−1.00
1.00	−0.94
2.00	−0.88
3.00	−0.81
4.00	−0.75
5.00	−0.69
6.00	−0.63
7.00	−0.56
8.00	−0.50

Which of the objects represented on Graph I could also be represented by Graph II?

A. A

B. B

C. C

D. D

ANSWER: C

Explanation:

The correct selection is the object in Graph I whose position–time line is straight and slopes downward at a constant rate. Graph II is a velocity–time graph with a horizontal line below zero. A horizontal velocity–time line means that velocity does not change as time passes, so the object travels with constant velocity. Because the line is below the zero-velocity axis, that constant velocity is negative. Under the stated sign convention, negative motion is toward the motion detector.

On a position–time graph, velocity is represented by the slope of the line. A straight line has a constant slope and therefore represents constant velocity. The required motion must also have a negative slope, because position must decrease uniformly over time when the velocity is negative. The selected object has exactly this pattern: its position decreases linearly as time increases. Its slope is therefore constant and negative, matching the constant negative velocity displayed in Graph II. This connection between the slope of a position-versus-time graph and velocity is a core interpretation rule for one-dimensional kinematics. See OpenStax Physics: Velocity vs. Time Graphs and The Physics Classroom: Position-Time Graphs.

QUESTION NO: 72

8% of 60 is 1/5 of what number?

A. 0.96

B. 12

C. 24

D. 240

E. 3,750

ANSWER: C

Explanation:

The correct answer is **24**. First, calculate 8% of 60 by converting 8% to its decimal equivalent, 0.08, and multiplying: 0.08 × 60 = 4.8. The question states that this result is one-fifth of an unknown number. If one-fifth of a number equals 4.8, multiply 4.8 by 5 to recover the whole number: 4.8 × 5 = 24. Equivalently, write the relationship as (1/5)n = 4.8 and multiply both sides by 5, giving n = 24. This approach uses the core ACT math skill of translating a verbal percent-and-fraction relationship into arithmetic or an equation. Checking confirms the result: one-fifth of 24 is 4.8, and 8% of 60 is also 4.8, so the two quantities are equal. For additional ACT preparation guidance, see the official ACT test-preparation resources. A review of percentages and proportional reasoning is also available from Khan Academy.

QUESTION NO: 73

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Difference Between a Llama and an Alpaca

Excerpted from KnowledgeNuts

[§1] One of the most obvious differences between the two species is their wool or (more accurately) their fiber. Both the llama and the alpaca have been raised <1> for their fiber, which is shorn once a year in both cases. The alpaca is much more prized for their <2> fiber, and for many farmers, that's the only reason they are raised.

[§2] There are two types of alpacas, each defined by their fiber; both types are soft and hypoallergenic. The Huacaya has a sheep-like appearance, with short, soft fiber. The Suri has a longer coat, with a fleece that gathers like ropes and hangs from the body. The fleece of both types of alpaca is very, very soft, and is usually used to make clothing. <3> There are 22 different "recognized" <4> colors for an alpaca, ranging from black to white and including every shade of brown, cream, and gray in between. Alpacas are typically one color, with white markings only on the face and legs, making their fleece uniform in color.

[§3] The llama, on the other hand, has two layers to their fleece. The inner coat is soft; on the animal, it keeps them warm while their outer coat, made of stiffer guard hairs, keeps them dry. <5>The undercoat is soft enough to use for clothing, while the outer coat is more often used to make more utilitarian items like rugs and ropes. <6> Before anything can be done with the fiber, the two coats have to be separated. Llamas come in fewer colors then alpacas, <7> and can be spotted.

[§4] Llamas are much larger than alpacas, and because of their size they can also be used as pack animals. <8> An adult llama usually stands around 1.8 meters (6 ft) tall and weighs anywhere between 125 and 200 kilogram <9> (280 and 450 lbs), while an average alpaca only stands about 0.9 meters (3 ft) tall at the shoulder and weighs between 45 and 80 kilograms (100 and 175 lbs).

[§5] While alpacas are mainly kept for their fleece, llamas can serve a few different purposes on a farm. When kept with other animals such as sheep, llamas can serve as guard animals against predators and intruders, although not all llamas have the personality for guard duty. Both are easy to train, and because of their size and strength, <10> llamas can be taught to pull carts and small carriages. Llamas can also be trained to accept a rider, although that rider needs to be fairly lightweight.

<8>:

A. NO CHANGE

B. and, because of their size they can also be used as pack animals

C. and because of their size, they can also be used as pack animals

D. and because, of their size they can also be used, as pack animals

ANSWER: C

Explanation:

The correct wording is **"and because of their size, they can also be used as pack animals."** The phrase "because of their size" introduces the reason llamas can serve as pack animals. When an introductory phrase such as this precedes the main clause "they can also be used as pack animals," standard written English uses a comma to mark the boundary between the introductory material and the independent clause. The comma helps readers immediately see that the phrase supplies a reason rather than forming part of the clause's core subject-and-verb structure.

The complete sentence also appropriately uses a comma before "and." It joins the independent clause "Llamas are much larger than alpacas" with the independent clause "because of their size, they can also be used as pack animals." This punctuation clearly presents two related complete ideas: llamas' greater size distinguishes them from alpacas, and that size enables their use as pack animals. The revised construction is concise, grammatically sound, and consistent with the informative tone of the passage. For guidance on commas after introductory elements, see the Purdue Online Writing Lab's comma rules. The ACT English practice guidance likewise emphasizes selecting punctuation that makes relationships between sentence elements clear.

QUESTION NO: 74

Swimming has developed from a primal mode of movement to an advanced hobby and competitive sport. Exercising nearly every muscle group, swimming is a rigorous sport and requires intense training. In competitions swimmers typically contend for the fastest time to complete a certain distance by performing a specific swimming stroke. Also, swimmers work to build endurance and an ability to swim over long distances. Because swimming has developed into a highly intricate competitive sport, where one wrong technique can disqualify a participant, it is interesting to ponder how the sport will evolve for people in the future, either advancing into a progressive purpose or regressing to a primal mode of movement.

The structure of this passage could be best described in what way?

A. An activity narrowed to a specific purpose and expanded to consider future implications.

B. An activity narrowed to a specific purpose and expanded to consider future deviations.

C. A hypothesis tested against certain conditions, developed into a larger thesis.

D. An activity and its purposes are explained.

E. A supposition regarding the prospect of an activity, analyzed for viability

ANSWER: B

Explanation:

"An activity narrowed to a specific purpose and expanded to consider future deviations." accurately describes the passage's overall progression. It opens broadly by presenting swimming as an ancient, primal form of human movement and then identifies its modern forms as recreation and organized sport. The discussion subsequently narrows to the competitive purpose of swimming: athletes seek the fastest time over a specified distance while using a designated stroke, and they train for endurance and technical precision. The final sentence broadens the focus again, shifting from present-day competition to a speculative consideration of swimming's possible future forms. In particular, it imagines movement away from its current highly regulated competitive form in either of two directions: toward a more progressive purpose or back toward a primal mode of movement. That movement from a broad activity, to its specialized competitive use, to possible future variations is the central structural pattern. This question assesses recognition of an author's organizational choices, a skill consistent with the ACT's focus on understanding ideas, development, and organization in passages. See the ACT test description and the Oxford Learner's Dictionaries for support on passage-analysis skills and the meaning of "deviation."

QUESTION NO: 75

A circle has a circumference of 16π feet. What is the radius of the circle, in feet?

A. The square root of 8.

B. 4

C. 8

D. 16

E. 32

ANSWER: C

Explanation:

The correct answer is **8**. A circle's circumference is calculated with the formula $C = 2\pi r$, where C is circumference and r is radius. Substituting the given circumference gives $16\pi = 2\pi r$. Dividing both sides by 2π isolates the radius: $r = 16\pi \div 2\pi = 8$. The π factor appears on both sides of the equation and cancels, leaving a radius of 8 feet. This result is also consistent with the related relationship that a circle's circumference equals π times its diameter: a circumference of 16π corresponds to a diameter of 16 feet, and the radius is half the diameter, or 8 feet. The unit requested is feet, so the numerical answer is 8. For a review of circumference formulas and the relationship among radius, diameter, and circumference, see Khan Academy's circle reference and OpenStax's circumference and area lesson.

QUESTION NO: 76

FILL BLANK

DeDe and Mike both run the length of a two-mile field. If DeDe runs 5 mph and Mike runs 6 mph, how many more minutes does it take DeDe to run the field?

A. 4

ANSWER: A

Explanation:

The correct answer is **4**. Use the relationship time = distance ÷ rate, keeping the units consistent. DeDe's time for 2 miles is 2 ÷ 5 hour, which is 0.4 hour. Since an hour contains 60 minutes, 0.4 × 60 = 24 minutes. Mike's time for the same 2-mile distance is 2 ÷ 6 hour, or 1/3 hour. Converting this to minutes gives (1/3) × 60 = 20 minutes. The question asks for how many *more* minutes DeDe takes, so subtract Mike's time from DeDe's time: 24 − 20 = 4 minutes. Thus, DeDe takes 4 additional minutes to run the two-mile field. This applies the standard rate, time, and distance formula used in ACT math problems: distance equals rate multiplied by time. For additional review of rate-based word problems and unit conversions, see ACT's Preparing for the ACT guide and OpenStax's overview of ratios and rates.

QUESTION NO: 77

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Industrial Revolution

[§1] The Industrial Revolution was essentially a rapid change in the method of production of material goods. <1> Products once made by hand were now able to be produced by machine or by chemical processes. The Industrial Revolution transformed Western society, creating an international capitalist economy, urbanization, labor reforms, a system to educate the public, <2> and labor specialization.

[§2] (1) In the first century of the Industrial Revolution, the country undergoing the most dramatic change was England. (2) After 1850, the Industrial Revolution spread rapidly <3> throughout Europe. (3) While the pace of change during the Industrial Revolution was indeed very rapid, the Industrial Revolution itself stretched over a rather long period of time – from the middle of the 18th century in the 1700s <4> through World War I (1914).

[§3] Several key discoveries and inventions enabled the Industrial Revolution to take place included <5> machines and tools like the cotton gin, the radio, the circular saw, the cylindrical press, and the steam engine. Cement, dynamite, and aluminum were invented, as were the bleaching and paper-making processes. At the same time, there was a tremendous growth in population and urbanization. In fact, the population growth in England was so dramatic that the country's population doubled between 1750–1820. This meant a great demand for food, clothing, and shelter, demands that became the driving force behind <6> the Industrial Revolution.

[§4] Mass production of goods was made possible in large part due to <7> the steam engine. The steam engine enabled factories to move from the countryside (where they were by bodies of water, their source of power) into cities and towns, which were becoming increasingly crowded. <8>

<6>:

A. NO CHANGE

B. which had become the driving force of

C. that forced the driving of

D. that drove the force behind

ANSWER: A

Explanation:

"NO CHANGE" is correct because it expresses the intended causal relationship clearly and uses an effective, standard construction. The noun "demands" is immediately followed by the restrictive relative clause "that became the driving force behind the Industrial Revolution," identifying what those demands did. The plural verb "became" correctly agrees with the plural subject "demands." In context, the passage explains that England's rapid population growth increased the need for necessities such as food, clothing, and shelter. Those increased needs stimulated production, innovation, and industrial development, so describing them as a driving force behind the Industrial Revolution is logical and precise. The phrase "the driving force behind" is also an idiomatic expression meaning an important cause or motivating influence. It fits the formal, explanatory tone of this historical passage without adding unnecessary wording or changing the meaning. This relationship between population growth, demand, and industrialization is consistent with historical accounts of the period, including the Encyclopaedia Britannica overview of the Industrial Revolution and the History.com summary of industrialization.

QUESTION NO: 78

A teacher provided the table below to the students in a science class. The table gives 5 properties for each of Sample A-H. The students were told to assume that each sample is a completely solid cube composed of a single hypothetical pure substance.

Sample	Mass (g)	Volume (cm^3)	Density (g/cm^3)	Melting point (°C)	Boiling point (°C)
A	8.0	4.0	2.0	126	747
B	8.0	4.0	2.0	342	959
C	6.0	3.0	2.0	237	885
D	6.0	3.0	2.0	237	885
E	8.0	2.0	4.0	126	747
F	8.0	2.0	4.0	126	747
G	4.0	1.0	4.0	126	747
H	4.0	1.0	4.0	342	959

Note: Assume that mass, volume, and density were determined at 20°C and that all 5 properties were determined at 1 atmosphere (atm) of pressure.

The teacher asked each of 4 students to explain how these data could be used to predict which samples are composed of the same substance.

Student 1

If 2 samples have the same values for all 5 properties, they are composed of the same substance. If 2 samples have different values for any of the 5 properties, they are composed of different substances.

Student 2

If 2 samples have the same values for any 3 or more of the 5 properties, they are composed of the same substance. If 2 samples have the same values for fewer than 3 of the 5 properties, they are composed of different substances.

Student 3

If 2 samples have the same mass, volume, and density, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither melting point nor boiling point, by itself, can distinguish between substances.

Student 4

If 2 samples have the same density, melting point, and boiling point, they are composed of the same substance. If 2 samples have different values for any of these 3 properties, they are composed of different substances. Neither mass nor volume, by itself, can distinguish between substances.

Based on Student 1's explanation, the same substance composes both of the samples in which of the following pairs?

A. Samples A and B

B. Samples B and C

C. Samples C and D

D. Samples D and E

ANSWER: C

Explanation:

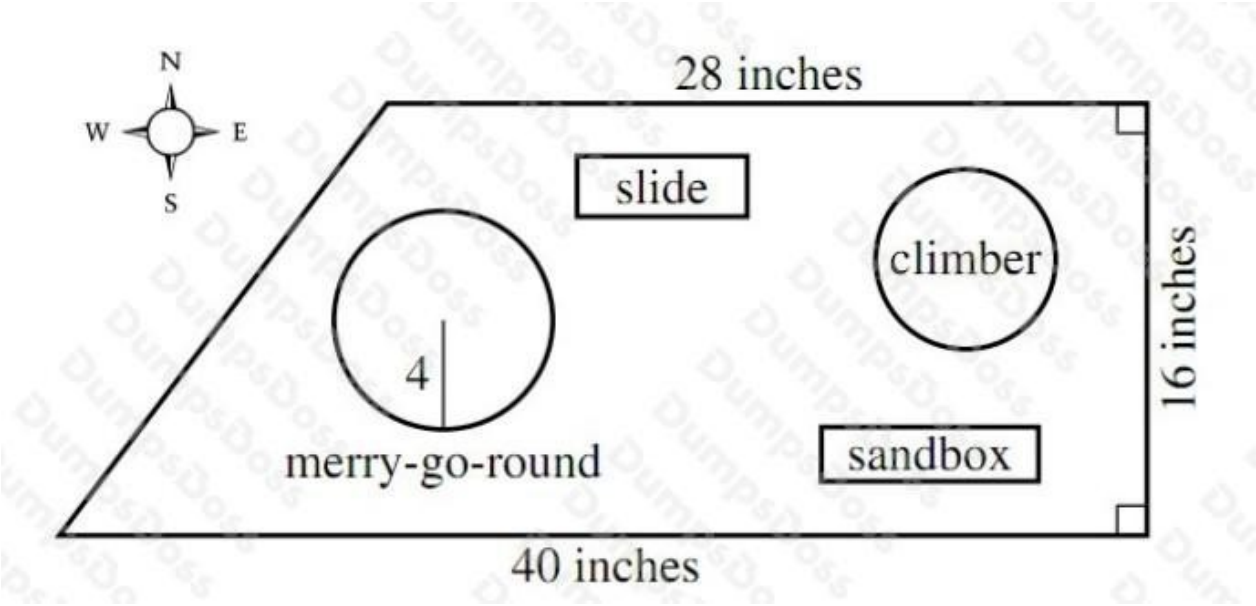
Samples C and D is correct because Student 1's stated rule requires an exact match across *all five* listed properties before two samples can be predicted to be the same substance. Comparing the entries for these two samples in the table shows that their mass, volume, density, melting point, and boiling point values all match. Therefore, this pair meets Student 1's complete five-property criterion.

The question asks students to apply the classification procedure supplied by Student 1, rather than to select properties based on their usual scientific usefulness. Under the stated assumptions, each sample is a solid cube made of one pure hypothetical substance, and the table values are the evidence to compare. A match must consequently be checked property by property, with no omitted or merely partial matches. The complete agreement for Samples C and D supports the prediction that they have the same composition according to the rule.

More generally, density is calculated from mass and volume, while melting point and boiling point are characteristic physical properties that can help identify pure substances. See OpenStax's discussion of physical and chemical properties and its treatment of density and measurements.

QUESTION NO: 79

Mikea, an intern with the Parks and Recreation Department, is developing a proposal for the new a trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and radius of the merry-go-round given in inches. In Mikea's scale drawing, 1 inch represents 1.5 feet.



The length of the south side of the park is what percent of the length of the north side?

A. 112%

B. 124%

C. 142 6/7 %

D. 175%

E. 250%

ANSWER: C

Explanation:

142 6/7 % is correct. To find what percent one length is of another, divide the south-side length by the north-side length and multiply by 100. The scale drawing shows a south side of 10 inches and a north side of 7 inches, so the required calculation is *(10 ÷ 7) × 100*. This equals *10/7 × 100 = 1 3/7 × 100 = 142 6/7%*. Although the drawing's scale states that each inch represents 1.5 feet, converting both sides to actual park measurements is unnecessary because the same scale factor

applies to each length and cancels in the ratio. For example, the actual lengths would be 15 feet and 10.5 feet, and *(15 ÷ 10.5) × 100* produces the same result. This question assesses proportional reasoning: a percentage comparison is based on the ratio of the two corresponding quantities, expressed per 100. ACT mathematics questions commonly require translating a verbal comparison such as “what percent of” into division in the stated order. See the ACT test-preparation resources and the OpenStax explanation of percent relationships.

QUESTION NO: 80

FILL BLANK

If the distance from point (−2, m) to point (4, −1) is 10 units, what is the positive value of m?

A. 7

ANSWER: A

Explanation:

The correct value is 7. Apply the coordinate-plane distance formula to the points (−2, *m*) and (4, −1): the horizontal change is 4 − (−2), or 6, and the vertical change is −1 − *m*. Because the distance is 10, these values satisfy $\sqrt{[6^2 + (-1 - m)^2]} = 10$. Squaring both sides gives $36 + (m + 1)^2 = 100$, so $(m + 1)^2 = 64$. Taking square roots produces $m + 1 = 8$ or $m + 1 = -8$, yielding $m = 7$ or $m = -9$. Since the question specifically requests the positive value, the required answer is 7. This approach uses the standard distance formula, which follows from the Pythagorean theorem: the changes in the horizontal and vertical coordinates form the legs of a right triangle, while the stated distance is its hypotenuse. See the OpenStax explanation of the distance formula and ACT’s official test-preparation resources.

QUESTION NO: 81

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Lightning in the Sand

[§1] As my friend Anna and I walked the sand dunes of southeastern New Mexico, she told me that she hoped we’d find a fulgurite, one as translucent white as the southeastern New Mexico sands around us. <1> A fulgurite – whose name stems from the Latin word fulgur, which means “thunderbolt” – is a hollow silica glass tube formed when lightning strikes sand. A fulgurite is created in one explosive second by fusion and pressure as sand heated by a lightning blast melts, <2> and becomes glass. Commonly called “petrified lightning,” a fulgurite places <3> the shape of a miniature lightning bolt into the earth, often branching deep into the ground.

[§2] Anna told me that I had possibly seen a small fragment of a fulgurite before, without realizing I had, on a beach. She explained though that even experts <4> are rarely able to locate a fully intact fulgurite. The thin, brittle glass tubes break easily. <5> Occasionally, after strong, sustained winds have shifted desert sands, while <6> an unbroken, previously buried fulgurite will be revealed, showing as a tube protruding from the ground. <7> I scanned the area, hopeful that I’d see a tube newly uncovered. <8> Anna made clear that we’d be lucky to come upon a small piece of fulgurite, just a few inches long.

[§3] Anna had shown me fulgurites she had found on other trips. Their colors ranged from black to brown to green, corresponding to the color of the sand in which she had discovered them. I wasn’t surprised that I’d never recognized fulgurites on any beach: no one had ever told me what to look for <9> Their interiors, though, are smooth, clear glass stained <10> with tiny bubbles trapped formed by air and moisture <11> during the rapid cooling of the melted sand after the lightning strike.

[§4] We continued exploring the dunes. Anna laughed and said we needed only to stop at the local gift shop to unearth <12> our treasure. <13> But given our <14> luck finding fulgurites in deserts and on beaches, <15> she wanted to keep searching to find our own piece of bright, white lightning in the sand.

<1>:

A. NO CHANGE

B. and nearly transparent to the eye almost as the white sands of these dunes.

C. as these sands.

D. DELETE the underlined portion and end the sentence with a period.

ANSWER: C

Explanation:

as these sands. is the best revision because it creates a clear, economical comparison: Anna hopes to find a fulgurite that is “as translucent white as these sands.” The demonstrative adjective “these” points directly to the dunes the narrator and Anna are currently walking, so the description remains specific and vivid without needlessly repeating “the southeastern New Mexico sands around us.” The phrase also preserves the intended comparison in a grammatically complete form. The construction “as [adjective] as [noun]” appropriately compares the fulgurite’s translucent whiteness with the whiteness of the nearby sand. In context, the concise wording supports the passage’s descriptive, first-person travel narrative: the reader can immediately picture the pale desert setting and understand why a similarly white fulgurite would be difficult yet exciting to find. ACT English questions reward revisions that maintain the author’s meaning while improving precision, clarity, and concision. This revision does all three, retaining the location established in the preceding phrase, “the sand dunes of southeastern New Mexico,” and avoiding redundant repetition. See ACT’s overview of the English test’s emphasis on revising and editing written text at ACT English practice questions and its test-description resources at ACT test preparation.

QUESTION NO: 82

A study was conducted to examine whether female Blattella germanica (a species of cockroach) prefer to eat cat food, cheese, ham, or peanuts. First, 200 mg of each of the 4 foods was separately placed into a single box. Then, adult female

B. germanica were added to the box. Figure 1 shows how the mass, in mg, of each food in the box changed over time after the addition of the

B. germanica. Table 1 shows the percent by mass of carbohydrates, lipids, proteins, and water, respectively, present in each of the 4 foods tested in the study.

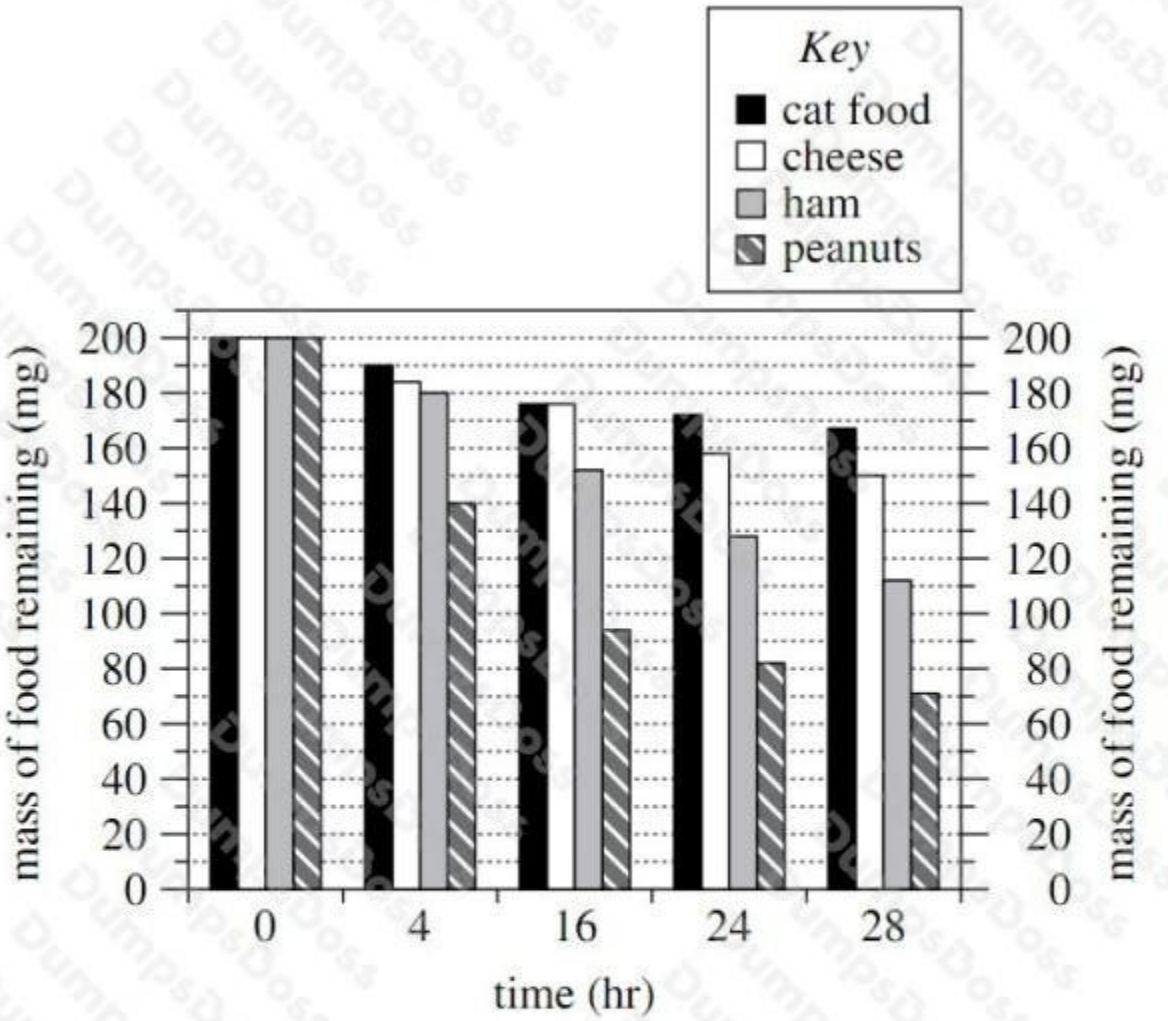


Figure 1

Figure adapted from Prachumporn Lauprasert et al., "Food Preference and Feeding Behavior of the German Cockroach, *Blattella germanica* (Linnaeus)." ©2006 by the Faculty of Science, Chulalongkorn University.

Table 1

Food	Percent by mass			
	carbohydrates	lipids	proteins	water
Cat food	1.2	6.0	16.9	66.2
Cheese	0.5	27.7	20.8	48.4
Ham	0.0	18.2	23.6	57.1
Peanuts	15.8	49.6	26.2	6.4

Table adapted from U.S. Department of Agriculture, *USDA National Nutrient Database for Standard Reference, Release 24*. 2011.

Based on Table 1, when 200 mg of each of the 4 foods was placed in the box, water accounted for more than 100 mg of the mass of which food(s)?

A. Peanuts only

B. Cat food and ham only

C. Cheese and peanuts only

D. Cat food, cheese, and ham only

ANSWER: B

Explanation:

Cat food and ham only is correct because the question asks for foods in which water makes up more than 100 mg of a 200 mg sample. This can be determined directly from the water percentages in Table 1. A water mass greater than 100 mg requires water to constitute more than one-half of the food's total mass, because 50% of 200 mg is exactly 100 mg. Thus, the relevant calculation is: water mass = (percent water expressed as a decimal) × 200 mg.

Table 1 shows that both cat food and ham have water percentages above 50%, so multiplying each of those percentages by 200 mg produces a water mass greater than 100 mg. The wording "more than 100 mg" is important: a food with exactly 50% water would contain 100 mg of water and would not meet the condition. This item assesses the ACT Science skill of interpreting numerical information in a table and applying a straightforward proportional calculation, rather than relying on the graph. ACT describes the Science section as requiring students to interpret and evaluate scientific information and data; see the official ACT test-preparation resources and the ACT test overview.

QUESTION NO: 83

You are given the following system of equations:

y = x2 rx + sy = t where r, s, and t are integers. For which of the following will there be more than one (x, y) solution, with real-number coordinates, for the system?

A. $s \neq 0$ and $r^2 + 4st > 0$

B. s2 − 4rt > 0

C. r2 − 4st < 0

D. s2 − 4rt < 0

E. s2 + 4rt < 0

ANSWER: A

Explanation:

The condition **$s \neq 0$ and $r^2 + 4st > 0$** produces more than one real-coordinate solution. Substituting $y = x^2$ into $rx + sy = t$ gives $sx^2 + rx - t = 0$. Because s is nonzero, this is a genuine quadratic equation in x. Each real solution for x determines exactly one y-value through $y = x^2$, so having more than one ordered-pair solution is equivalent to having two distinct real roots for that quadratic.

For a quadratic equation $ax^2 + bx + c = 0$, two distinct real roots occur precisely when its discriminant, $b^2 - 4ac$, is positive. Here, a = s, b = r, and c = −t. Therefore, the discriminant is $r^2 - 4(s)(-t) = r^2 + 4st$. Requiring $r^2 + 4st$ to be greater than zero guarantees two distinct real x-values and consequently two distinct real points satisfying both equations. The explicit requirement that s be nonzero is needed because otherwise the substituted equation is linear rather than quadratic. See OpenStax's discussion of quadratic equations and Khan Academy's discriminant review.

QUESTION NO: 84

When x = 1/2, what is the value of (8x − 3) / x?

A. 1/2

B. 2

C. 5/2

D. 5

E. 10

ANSWER: B

Explanation:

The correct value is **2**. Substitute 1/2 for x in the expression: (8x − 3) / x becomes (8(1/2) − 3) / (1/2). First evaluate the numerator. Multiplying 8 by 1/2 gives 4, and subtracting 3 gives 1. The expression is therefore 1 divided by 1/2. Dividing by a fraction is equivalent to multiplying by its reciprocal, so 1 ÷ 1/2 = 1 × 2 = 2. This problem tests accurate substitution, correct order of operations, and fraction division. Keeping parentheses around the numerator helps ensure that the subtraction is completed before dividing by x. ACT mathematics questions commonly assess these foundational algebra skills, including evaluating expressions after replacing a variable with a given number. For additional review of fraction operations, see Khan Academy's fraction arithmetic resources. The ACT's official mathematics overview is available at ACT Math practice questions.

QUESTION NO: 85

Climate Change: How Do We Know?

https://climate.nasa.gov/evidence/

(1) The Earth's climate has changed throughout history. Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about7,000 years ago marking the beginning of the modern climate era – and of human civilization. Most of these climate changes are attributed to very small variations in Earth's orbit that change the amount of solar energy our planet receives.

(2) The current warming trend is of particular significance because most of it is extremely likely (greater than 95 percent probability) to be the result of human activity since the mid-20th centuryand proceeding at a rate that is unprecedented over decades to millennia.

(3) Earth-orbiting satellites and other technological advances have enabled scientists to see the big picture, collecting many different types of information about our planet and its climate on aglobal scale. This body of data, collected over many years, reveals the signals of a changing climate.

(4) The heat-trapping nature of carbon dioxide and other gases was demonstrated in the mid-19th century. Their ability to affect the transfer of infrared energy through the atmosphere is thescientific basis of many instruments flown by NASA. There is no question that increased levels of greenhouse gases must cause the Earth to warm in response.

(5) Ice cores drawn from Greenland, Antarctica, and tropical mountain glaciers show that the Earth's climate responds to changes in greenhouse gas levels. Ancient evidence can also be foundin tree rings, ocean sediments, coral reefs, and layers of sedimentary rocks. This ancient, or paleoclimate, evidence reveals that current warming is occurring roughly ten times faster than the average rate of ice-age-recovery warming.

(6) The evidence for rapid climate change is compelling: Sea Level Rise

(7) Global sea level rose about 8 inches in the last century. The rate in the last two decades, however, is nearly double that of the last century.

Global Temperature Rise

(8) The planet's average surface temperature has risen about 2.0 degrees Fahrenheit (1.1 degrees Celsius) since the late 19th century, a change driven largely by increased carbon dioxide andother human-made emissions into the atmosphere. Most of the warming occurred in the past 35 years, with 16 of the 17 warmest years on record occurring since 2001. Not only was 2016 the warmest year on record, but eight of the 12 months that make up the year – from January through September, with the exception of June – were the warmest on record for those respective months.

Warming Oceans

(9) The oceans have absorbed much of this increased heat, with the top 700 meters (about 2,300 feet) of ocean showing warming of 0.302 degrees Fahrenheit since 1969.

Shrinking Ice Sheets

(10) The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometers (36 to60 cubic miles) of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometers (36 cubic miles) of ice between 2002 and 2005.

Declining Arctic Sea Ice

(11) Both the extent and thickness of Arctic sea ice has declined rapidly over the last several decades.

Glacial Retreat

(12) Glaciers are retreating almost everywhere around the world – including in the Alps, Himalayas, Andes, Rockies, Alaska and Africa.

Extreme Events

(13) The number of record high temperature events in the United States has been increasing, while the number of record low temperature events has been decreasing, since 1950. The U.S. hasalso witnessed increasing numbers of intense rainfall events.

Ocean Acidification

(14) Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30 percent. This increase is the result of humans emitting more carbon dioxideinto the atmosphere and hence more being absorbed into the oceans. The amount of carbon dioxide absorbed by the upper layer of the oceans is increasing by about 2 billion tons per year.

Decreased Snow Cover

(15) Satellite observations reveal that the amount of spring snow cover in the Northern Hemisphere has decreased over the past five decades and that the snow is melting earlier.

The human activity that, with 95 percent certainty, is causing current significant warming trends began:

A. With the Industrial Revolution

B. With the Renaissance

C. With the mid-19th Century

D. With the mid-20th Century

ANSWER: D

Explanation:

With the mid-20th Century is correct because the passage directly identifies the relevant starting period in paragraph 2. It states that the current warming trend is extremely likely—defined there as greater than 95 percent probability—to result from human activity "since the mid-20th century." The question asks specifically when the human activity associated with the current significant warming trend began, so the answer must reproduce that stated time frame rather than select a different historical event or the date when a scientific principle was demonstrated.

The passage distinguishes the modern, human-driven warming trend from climate changes that occurred earlier in Earth's history. It also supports the conclusion through multiple long-term observations, including rising global temperature, ocean warming, ice loss, sea-level rise, and changes in snow cover. NASA's climate evidence overview explains that the present warming trend is occurring at a rate unprecedented over many centuries to millennia and attributes it principally to human activities since the mid-20th century. See NASA: Evidence. The broader scientific assessment of human influence on warming is also summarized by the IPCC Sixth Assessment Report Synthesis Report.

QUESTION NO: 86

A streaming box with a list price of $120 is marked down 30%. If Steve gets an employee discount of 20% off the sale price, how much does he pay for the device?

A. $67.20

B. $72.30

C. $78.40

D. $80.00

ANSWER: A

Explanation:

The correct payment is **$67.20**. A 30% markdown means that 70% of the original $120 list price remains. Converting 70% to its decimal equivalent and multiplying gives the sale price: $120 × 0.70 = $84. The employee discount is then applied to that reduced sale price, not to the original list price. Since a 20% discount leaves 80% of the sale price to be paid, calculate $84 × 0.80 = $67.20. Equivalently, the two successive discounts can be represented by multiplying the original price by both remaining-percent factors: $120 × 0.70 × 0.80 = $67.20. This illustrates an important percent problem principle: when discounts occur one after another, each percentage is applied to the current price at that stage. On ACT mathematics questions, clearly identifying the base quantity for each percentage and translating the remaining percentage into a decimal multiplier helps avoid treating successive discounts as a single additive discount. ACT's preparation materials describe the mathematical skills assessed in the test at ACT Test Preparation; additional official math practice resources are available through ACT Math Practice Questions.

QUESTION NO: 87

Mark's chemistry project was to study the structure of crystals of the amino acids glycine and Lalanine. First, this involved growing large enough crystals for analysis. Most crystals are grown from supersaturated solutions. Supersaturated solutions have an excess amount of solute dissolved in a solvent at a given temperature. To prepare samples, Mark combined 2 g of water with 40% more amino acid than is normally soluble in that amount of water at room temperature. He then heated the samples until the amino acid completely dissolved and allowed them to slowly cool to room temperature.

With glycine, Mark obtained crystals suitable for analysis in 17 out of 20 samples and he was able to collect the data he needed. With L-alanine, he ran into problems. Namely, none of the Lalanine samples crystallized. He tried to increase the super saturation by dissolving 50%, 60% and 70% more L-alanine in excess of solubility, to increase the driving force for crystallization in these samples. But that didn't seem to help.

After a few weeks, Mark observed a cotton-like substance in some of his L-alanine samples. He was sure that these weren't L-alanine crystals. After spending some time in the library, he found that the amino acid L-alanine is prone to bacterial attack. He hypothesized that bacteria were eating his samples and that the cotton-like substance was a bacterial byproduct. He prepared 20 new L-alanine samples. All of the samples were 40% supersaturated in 2 g of water at room temperature. Mark took great care to keep his samples sterile. He used water that had been passed through a 0.22 µm filter and treated by UV rays. Mark was able to obtain crystals from 15 out of 20 solutions.

Mark's hypothesis that he wasn't obtaining crystals because bacteria were feeding on his samples:

A. was probably correct.

B. was probably incorrect.

C. was not formed in accordance with the scientific method.

D. could not be tested.

ANSWER: A

Explanation:

"was probably correct." is supported by the experimental results. Mark first observed that L-alanine solutions did not crystallize, even after he increased the degree of supersaturation. He then identified a plausible additional factor: bacterial contamination, suggested by the cotton-like material and information that L-alanine is susceptible to bacterial attack. To test

that hypothesis, he prepared a new set of solutions under the same stated supersaturation conditions while taking measures intended to reduce microbial contamination, including 0.22 µm filtration and UV treatment of the water. In this new set, crystals formed in 15 of 20 samples. This substantial change in crystallization outcome after introducing sterility precautions supports the conclusion that bacterial activity was likely interfering with the earlier samples. The result does not establish absolute proof that bacteria were the sole cause, but the wording “probably correct” appropriately reflects evidence-based scientific reasoning: a hypothesis gains support when a test designed around its prediction produces the expected result. This use of observations, a testable explanation, and experimental evidence aligns with the scientific-method practices described by the National Academies and the experimental-design guidance of Encyclopaedia Britannica.

QUESTION NO: 88

Should Churches Be Taxed? Pros and Cons

http://churchesandtaxes.procon.org

'PRO' PASSAGE

(1) Exempting churches from taxation upholds the separation of church and state embodied by the Establishment Clause of the First Amendment of the US Constitution. The US Supreme Court, in a majority opinion written by Chief Justice Warren

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”

(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”

(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.

(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”

(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren

E. Burger in his majority opinion in Walz

v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”

(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.

'CON' PASSAGE

(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”

(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.

(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.

(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”

(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

H. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."

(12) The tax code makes no distinction between authentic religions and fraudulent startup “faiths,” which benefit at taxpayers’ expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties. In Mar. 2004, the IRS warned of an increase in schemes that “exploit legitimate laws to establish sham one-person, nonprofit religious corporations” charging $1,000 or more per person to attend “seminars.” The Church of Scientology, which TIME Magazine described in May 1991 as a “thriving cult of greed and power” and “a hugely profitable global racket,” was granted federal income tax exemption in Oct. 1993. The New York Times reported that this “saved the church tens of millions of dollars in taxes.”

This question pertains to the “CON” portion of the passage. Choose the answer that best completes the following question.

The authors of the “CON” passage would most likely see atheists as:

A. Just another religious group looking to cash in on tax exemption.

B. A highly persecuted group deserving of tax exemption.

C. A group whose nonbelief is just as or more viable than traditional faiths, yet who is discriminated against through the practice of tax exemptions for religious bodies.

D. Targets of the U.S. Supreme Court.

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”
(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: “the power to tax involves the power to destroy.”
(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.
(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”
(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren
Burger in his majority opinion in Walz
v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”
(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if

churches were to lose their tax exemptions.
'CON' PASSAGE
(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”
(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.
(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.
(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”
(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

F. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."
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This question pertains to the “CON” portion of the passage. Choose the answer that best completes the following question. The authors of the “CON” passage would most likely see atheists as:

ANSWER: C

Explanation:

A group whose nonbelief is just as or more viable than traditional faiths, yet who is discriminated against through the practice of tax exemptions for religious bodies is correct because it accurately synthesizes the CON passage’s argument about equal treatment of believers and nonbelievers. In paragraph 7, Justice Douglas’s dissent is used to contend that public financial support for believers creates unequal treatment when nonbelievers do not receive comparable support. The passage presents this disparity as arising from religious belief: people are treated differently under the law because of their religious commitments or lack of them. Thus, atheists are portrayed as people whose nonbelief should not result in a financial disadvantage imposed through tax policy.

Paragraph 10 reinforces that interpretation by arguing that church-property exemptions shift part of the tax burden to all taxpayers, including atheists and people without religion. The CON authors therefore regard atheists as citizens affected by a system that financially benefits religious institutions while requiring nonbelievers to help make up foregone public revenue. This perspective follows the dissenting position in Walz v. Tax Commission of the City of New York. The passage’s broader constitutional concern is that government support of religion can compromise neutrality toward both religion and nonreligion, a principle reflected in the First Amendment.

QUESTION NO: 89

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Mystery Paper Sculptor

[§1] Between March and November of 2011, an anonymous donor left intricately <1> crafted paper sculptures at various cultural institutions in Edinburgh, Scotland. Delighted, each sculpture was left secretly and was later discovered by staff. <2>

The delicate sculptures – streetscapes, plants, and animals – were carved exclusively from the pages and bindings of books. The tiny details in the pieces are awe-inspiring.

[§2] The first sculpture discovered – at the Scottish Poetry Library – was a tiny tree formed from a book of verse. Library staff dubbed <3> it the "poetree." The tree sits atop a book. Beneath the tree are the halves of a golden paper egg, each half filled with words clipped from the poem "A Trace of Wings" by Edwin Morgan. At Edinburgh's Filmhouse Cinema, a three-dimensional sculpted scene <4> shows patrons sitting in a movie theater as horse leaps <5> out of the screen. At the Scottish Storytelling Centre, a dragon crafted from the pages <6> of a mystery novel was found nesting in a window. At the National Museum of Scotland, a paper tail was spotted emerging from the spine of Sir Arthur Conan Doyle's book The Lost World. Inside, a dinosaur charges through shredded pages of the open book. More creations appeared at more than a few additional places where literature and artifacts are related to <7> books and writing. Therefore, <8> a total of ten sculptures were bestowed on special institutions, whose staff are thrilled by their luck.

[§3] The creator of these sculptures are <9> not known because no one has claimed responsibility. So far, that is. The last gift came with a note in which the mystery artist reveals her gender. Whatever: whoever <10> created the art, your <11> intention is clear. Each gift came with a note expressing special gratitude <12> for "libraries, books, words, ideas." <13>

[§4] Ironically, the creator of these exquisite sculptures who destroyed books <14> – cutting them up with <15> refashioning them into elaborate works of art – as "a tiny gesture in support of the special places." The mystery artist celebrated the magic of those places and, at the same time, made some magic.

<4>:

A. NO CHANGE

B. Cinema, a three-dimensional sculpted, scene

C. Cinema a three-dimensional sculpted scene,

D. Cinema a three-dimensional, sculpted, scene

ANSWER: A

Explanation:

NO CHANGE is correct because it uses punctuation and modifiers clearly and conventionally. The opening prepositional phrase, "At Edinburgh's Filmhouse Cinema," identifies the location where the sculpture was found. A comma properly separates this introductory phrase from the independent clause that follows: "a three-dimensional sculpted scene shows patrons …" This construction lets the reader immediately see both the setting and the subject of the sentence.

The phrase "three-dimensional sculpted scene" is also correctly written without commas. Here, "three-dimensional" and "sculpted" work together to describe the kind of scene being discussed: it is a scene made through sculpture and presented in three dimensions. The modifiers are not being presented as separate, equal descriptors that require comma separation. Keeping the phrase intact supports the passage's concise, descriptive style and maintains a smooth transition to the explanation of the movie-theater scene and the horse appearing to leap from the screen.

For guidance on commas after introductory elements, see the Purdue Online Writing Lab's comma guidance. ACT English questions assess the ability to choose wording that is grammatically sound and rhetorically effective, as described by ACT English practice materials.

QUESTION NO: 90

Should Churches Be Taxed? Pros and Cons

http://churchesandtaxes.procon.org

'PRO' PASSAGE

(1) Exempting churches from taxation upholds the separation of church and state embodied by the Establishment Clause of the First Amendment of the US Constitution. The US Supreme Court, in a majority opinion written by Chief Justice Warren

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: "The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal

relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other."

(2) Requiring churches to pay taxes would endanger the free expression of religion and violate the Free Exercise Clause of the First Amendment of the US Constitution. By taxing churches, the government would be empowered to penalize or shut them down if they default on their payments. The US Supreme Court confirmed this in McCulloch v. Maryland (1819) when it stated: "the power to tax involves the power to destroy."

(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.

(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked "will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all."

(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren

E. Burger in his majority opinion in Walz

v. Tax Commission of the City of New York (1970), "The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees 'on the public payroll.' There is no genuine nexus between tax exemption and establishment of religion."

(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: "All of a sudden, we would be hit with something we haven't had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings." Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.

'CON' PASSAGE

(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: "If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional."

(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.

(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.

(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: "no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused."

(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

H. Rehnquist, then-Chief Justice of the US Supreme Court, declared on behalf of a unanimous court in Regan v. Taxation with Representation (1983): "Both tax exemptions and tax deductibility are a form of subsidy that is administered through the tax system. A tax exemption has much the same effect as a cash grant to the organization of the amount of tax it would have to pay on its income."

(12) The tax code makes no distinction between authentic religions and fraudulent startup "faiths," which benefit at taxpayers' expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties. In Mar. 2004, the IRS warned of an increase in schemes that "exploit legitimate laws to establish sham one-person, nonprofit religious corporations" charging $1,000 or more per person to attend "seminars." The Church of Scientology, which TIME Magazine described in May 1991 as a "thriving cult of greed and power" and "a hugely profitable global racket," was granted

federal income tax exemption in Oct. 1993. The New York Times reported that this “saved the church tens of millions of dollars in taxes.”

This question pertains to the “PRO” portion of the passage. Choose the answer that best completes the following question.

The word “nexus” at the end of paragraph 5 likely means:

A. Disconnection.

B. Collusion.

C. Connection.

D. Rebuttal.

E. Burger in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “The exemption creates only a minimal and remote involvement between church and state, and far less than taxation of churches. It restricts the fiscal relationship between church and state, and tends to complement and reinforce the desired separation insulating each from the other.”
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(3) Churches earn their tax exemption by contributing to the public good. Churches offer numerous social services to people in need, including soup kitchens, homeless shelters, afterschool programs for poor families, assistance to victims of domestic violence, etc. These efforts relieve government of doing work it would otherwise be obliged to undertake.
(4) Taxing churches would place government above religion. The Biblical book of Judges says that those who rule society are appointed directly by God. Evangelist and former USA Today columnist Don Boys, PhD, asked “will any Bible believer maintain that government is over the Church of the Living God? I thought Christ was preeminent over all.”
(5) A tax exemption for churches is not a subsidy to religion, and is therefore constitutional. As stated by US Supreme Court Chief Justice Warren
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v. Tax Commission of the City of New York (1970), “The grant of a tax exemption is not sponsorship, since the government does not transfer part of its revenue to churches, but simply abstains from demanding that the church supports the state. No one has ever suggested that tax exemption has converted libraries, art galleries, or hospitals into arms of the state or put employees ‘on the public payroll.’ There is no genuine nexus between tax exemption and establishment of religion.”
(6) Poor and disadvantaged people relying on assistance from their local churches would suffer if churches were to lose their tax-exempt status. According to Vincent Becker, Monsignor of the Immaculate Conception Church in Wellsville, NY, the food and clothing programs his church offers would be threatened by a tax burden: “All of a sudden, we would be hit with something we haven’t had to face in the past… We base all the things that we do on the fact that we do not have to pay taxes on the buildings.” Crucial services would either be eliminated or relegated to cash-strapped local governments if churches were to lose their tax exemptions.
'CON' PASSAGE
(7) Tax exemptions for churches violate the separation of church and state enshrined in the Establishment Clause of the First Amendment of the US Constitution. By providing a financial benefit to religious institutions, government is supporting religion. Associate Justice of the US Supreme court, William O. Douglas, in his dissenting opinion in Walz v. Tax Commission of the City of New York, decided May 4, 1970, stated: “If believers are entitled to public financial support, so are nonbelievers. A believer and nonbeliever under the present law are treated differently because of the articles of their faith… I conclude that this tax exemption is unconstitutional.”
(8) A tax exemption is a privilege, not a right. Governments have traditionally granted this privilege to churches because of the positive contribution they are presumed to make to the community, but there is no such provision in the US Constitution.
(9) Churches receive special treatment from the IRS beyond what other nonprofits receive, and such favoritism is unconstitutional. While secular charities are compelled to report their income and financial structure to the IRS using Form 990 (Return of Organization Exempt From Income Tax), churches are granted automatic exemption from federal income tax without having to file a tax return.
(10) A tax break for churches forces all American taxpayers to support religion, even if they oppose some or all religious doctrines. As Mark Twain argued: “no church property is taxed and so the infidel and the atheist and the man without religion are taxed to make up the deficit in the public income thus caused.”
(11) A tax exemption is a form of subsidy, and the Constitution bars government from subsidizing religion. William

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(12) The tax code makes no distinction between authentic religions and fraudulent startup “faiths,” which benefit at taxpayers’ expense. In spring 2010, Oklahoma awarded tax exempt status to Satanist group The Church of the IV Majesties.

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This question pertains to the “PRO” portion of the passage. Choose the answer that best completes the following question. The word “nexus” at the end of paragraph 5 likely means:

ANSWER: C

Explanation:

“Connection.” is correct because *nexus* means a connection, link, or association between two things. The sentence states that there is “no genuine nexus between tax exemption and establishment of religion.” In context, the writer argues that exempting a church from tax does not create a meaningful connection between the government’s tax policy and the governmental establishment or sponsorship of religion. The surrounding examples reinforce this meaning: tax exemptions for libraries, art galleries, and hospitals do not make those institutions arms of the state or place their employees on the public payroll. Likewise, the passage maintains that an exemption is government refraining from collecting money rather than actively transferring government funds to a church. Therefore, the intended meaning is the absence of a real link between the exemption and an unconstitutional establishment of religion. This context-based approach—using the sentence’s claim and its supporting examples to infer a word’s meaning—is the appropriate method for an ACT vocabulary-in-context question. Dictionary definitions likewise identify *nexus* as a connection or link. See Merriam-Webster’s definition of “nexus” and the Supreme Court’s decision in Walz v. Tax Commission.

QUESTION NO: 91

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Yoga

[§1] One of today’s hottest fads is also one of the world’s oldest practices: the ancient art of yoga. At first, I thought yoga was just another fitness fad, like step aerobics classes or Tae Bo. But after my first class, I understood why yoga has lasted for thousands of years, and why so many people are completely into <1> this practice.

[§2] Yoga is different from other fitness activities because it is not only physical. In the correct form, <2> yoga is a practice of unification: an emotional, spiritual, and physical exercise.

[§3] Though it may seem easy to those who <3> have never practiced, yoga poses require great concentration, and they are surprisingly effective in stretching and strengthening muscles. A simple sitting pose such as staff pose, for example, requires you to tighten and lengthen stomach, back, and arm muscles as you stretch you’re <4> legs out in front of you and place your hands by your side. More difficult poses, such as brave warrior, require you to balance on one leg and hold a pose that strengthens leg, back, and stomach muscles.

[§4] While yoga tones and strengthens the body, it also tones and strengthens the mind. Many poses can be only held <5>if you are completely focused on the task, and full benefit of the poses comes only through proper breathing. Concentrated, deep breathing during yoga helps you extend more fully into the poses, thereby gaining greater benefit from the stretch. And the steady circulation of breath through your body both calms and energizes.

[§5] I am still relatively new to yoga. I have only been practicing for one year. I am addicted to yoga <6> unlike any other physical activity because it is also a spiritual practice. Through yoga, I am able to release tensions that lodge in various parts of my body: the tight shoulders, the cramped legs, the belly that is in knots. <7> The physical release is also a spiritual release: I feel calm after doing yoga, reconnected to my body, reconnected to myself, more at peace with the world. After a series of asanas (poses), I feel the universal life force within.

<1>:

A. NO CHANGE

B. hooked on

C. devoted to

D. practitioners of

ANSWER: C

Explanation:

“devoted to” is the best revision because it conveys strong, sustained commitment to yoga while maintaining the passage’s reflective and moderately formal tone. The paragraph begins with a conversational personal observation, but it also discusses yoga as an ancient practice with lasting cultural and spiritual significance. Saying that many people are “completely devoted to this practice” clearly communicates that practitioners feel deeply committed to yoga, not merely interested in it temporarily. The phrase is also grammatically smooth: the adjective “devoted” is conventionally followed by the preposition “to,” and “this practice” supplies a clear object for that devotion. This wording supports the author’s transition from initially dismissing yoga as a short-lived fitness trend to recognizing why it has endured for thousands of years. In ACT English questions, the strongest choice must preserve the intended meaning while fitting the passage’s level of diction and establishing a precise relationship between ideas. Guidance on effective word choice and maintaining an appropriate style can be found in the Purdue OWL writing resources and ACT’s English practice materials.

QUESTION NO: 92

Mark’s chemistry project was to study the structure of crystals of the amino acids glycine and Lalanine. First, this involved growing large enough crystals for analysis. Most crystals are grown from supersaturated solutions. Supersaturated solutions have an excess amount of solute dissolved in a solvent at a given temperature. To prepare samples, Mark combined 2 g of water with 40% more amino acid than is normally soluble in that amount of water at room temperature. He then heated the samples until the amino acid completely dissolved and allowed them to slowly cool to room temperature.

With glycine, Mark obtained crystals suitable for analysis in 17 out of 20 samples and he was able to collect the data he needed. With L-alanine, he ran into problems. Namely, none of the Lalanine samples crystallized. He tried to increase the super saturation by dissolving 50%, 60% and 70% more L-alanine in excess of solubility, to increase the driving force for crystallization in these samples. But that didn’t seem to help.

After a few weeks, Mark observed a cotton-like substance in some of his L-alanine samples. He was sure that these weren’t L-alanine crystals. After spending some time in the library, he found that the amino acid L-alanine is prone to bacterial attack. He hypothesized that bacteria were eating his samples and that the cotton-like substance was a bacterial byproduct. He prepared 20 new L-alanine samples. All of the samples were 40% supersaturated in 2 g of water at room temperature. Mark took great care to keep his samples sterile. He used water that had been passed through a 0.22 μm filter and treated by UV rays. Mark was able to obtain crystals from 15 out of 20 solutions.

It can be inferred from the passage that UV treatment is used to:

A. increase super saturation in solutions of amino acids.

B. cause skin cancer in tanning salons.

C. kill microorganisms.

D. filter solutions of amino acids.

ANSWER: C

Explanation:

The correct answer is **“kill microorganisms.”** The passage directly connects the new preparation procedure with Mark’s effort to keep the L-alanine samples sterile after he concluded that bacteria were consuming the amino acid and producing the cotton-like material. He treated the water with ultraviolet rays as part of this sterilization process, then obtained crystals from most of the newly prepared samples. Thus, the intended purpose of the ultraviolet treatment was to reduce or eliminate bacteria and other microorganisms that could contaminate the samples and interfere with crystallization.

Ultraviolet germicidal irradiation works because sufficiently energetic ultraviolet light can damage microorganisms’ nucleic acids, preventing replication and thereby inactivating them. This is why ultraviolet treatment is used in certain water-treatment and laboratory sterilization applications, though its effectiveness depends on factors such as dose, exposure, and

whether organisms are shielded by particles. In the passage, the 0.22 μm filtration and ultraviolet treatment are both described in the context of sterile sample preparation, supporting the inference that the ultraviolet step targeted microbial contamination. The U.S. Environmental Protection Agency discusses ultraviolet disinfection in its Ultraviolet Disinfection Guidance Manual, and the Centers for Disease Control and Prevention provides background on ultraviolet germicidal irradiation.

QUESTION NO: 93

Which of the following statements is always true if p is a rational number?

A. |p| < |3p|

B. |p2| > |p + 1|

C. |–p| > p

D. |p3| > |p2|

E. |p−p| > p−p

F. |p| ≥ 0

ANSWER: F

Explanation:

|p| ≥ 0 is always true because absolute value represents a number's distance from zero on the number line. Distances cannot be negative, so the absolute value of every rational number is either positive or equal to zero. This remains true regardless of whether p is a positive rational number, a negative rational number, a fraction, an integer, or zero. In particular, when p equals zero, |p| equals zero; for any nonzero rational value, |p| is positive. The inclusion of equality is essential because zero is rational and is the one value whose absolute value is not positive. This statement therefore applies to every possible rational value of p without requiring any additional condition. For a definition and properties of absolute value, see OpenStax Elementary Algebra. Additional practice with absolute-value concepts is available from Khan Academy.

QUESTION NO: 94

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Industrial Revolution

[§1] The Industrial Revolution was essentially a rapid change in the method of production of material goods. <1> Products once made by hand were now able to be produced by machine or by chemical processes. The Industrial Revolution transformed Western society, creating an international capitalist economy, urbanization, labor reforms, a system to educate the public, <2> and labor specialization.

[§2] (1) In the first century of the Industrial Revolution, the country undergoing the most dramatic change was England. (2) After 1850, the Industrial Revolution spread rapidly <3> throughout Europe. (3) While the pace of change during the Industrial Revolution was indeed very rapid, the Industrial Revolution itself stretched over a rather long period of time – from the middle of the 18th century in the 1700s <4> through World War I (1914).

[§3] Several key discoveries and inventions enabled the Industrial Revolution to take place included <5> machines and tools like the cotton gin, the radio, the circular saw, the cylindrical press, and the steam engine. Cement, dynamite, and aluminum were invented, as were the bleaching and paper-making processes. At the same time, there was a tremendous growth in population and urbanization. In fact, the population growth in England was so dramatic that the country's population doubled between 1750–1820. This meant a great demand for food, clothing, and shelter, demands that became the driving force behind <6> the Industrial Revolution.

[§4] Mass production of goods was made possible in large part due to <7> the steam engine. The steam engine enabled factories to move from the countryside (where they were by bodies of water, their source of power) into cities and towns, which were becoming increasingly crowded. <8>

<7>:

A. NO CHANGE

B. by

C. from

D. in regard to

ANSWER: B

Explanation:

by is correct because it supplies the standard, direct preposition for identifying the means or agent that made something possible. In the passive construction “Mass production of goods was made possible … the steam engine,” the steam engine is the technological force that enabled mass production. The resulting phrase, “was made possible in large part by the steam engine,” is concise, idiomatic, and precise. It also fits the passage’s factual, expository style: the sentence names a historical development and immediately identifies the invention responsible for enabling it.

English commonly uses *by* after passive verbs to introduce the person, object, process, or force performing the action or producing the result. Here, “made possible” functions as a passive verb phrase, and “the steam engine” supplies the enabling cause. The modifier “in large part” appropriately qualifies the claim, recognizing that the steam engine was a major contributor rather than necessarily the sole cause. This wording keeps the sentence focused, clear, and grammatically conventional for edited prose. For guidance on passive-voice constructions and the use of *by* to identify an agent, see the Purdue Online Writing Lab’s discussion of active and passive voice and the Cambridge Dictionary grammar reference on passive forms.

QUESTION NO: 95

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

The Real McCoy

[§1] “It’s the real McCoy.” You might have heard this expression before, but who – or what – is a McCoy, real or otherwise? The saying has been used for generations to declare its’ <1> the genuine article, the original and best. [A] While its origin is disputed, many people believe the expression was inspired by the inventions of a Canadian American engineer named, <2> Elijah McCoy. McCoy, a railroad worker who, as a teenager, had formally studied mechanical engineering, revolutionized railroad and factory operations, affecting both incredibly <3> with his dozens of patented products.

[§2] While working for the Michigan Central Railroad in the 1870s, then <4> McCoy was assigned to work on the wheel bearings and axles of trains. <5> Trains needed to come to a halt after only a few miles of travel so that the moving parts could be oiled by hand – a tedious, time-consuming process. McCoy invented a device that released oil while a train was in motion, substantially reducing the number <6> of maintenance stops had the effect of making <7> travel more efficient. [B] This automatic lubricating device became the first of his fifty-seven patents.

[§3] McCoy applied the principles of this invention to other engineering challenges. Factories in the late 1800s, for example, <8> increasingly relied on steam engines to power factory machines. As with trains, therefore <9> many of the machines’ parts had to be oiled manually. McCoy, recognizing <10> the similarities between train wheels and factory machines, designed automated oilers for steam engines. These innovations allowed factories to give machines a certain timelessness, <11> increasing factory productivity and, as a result, profits. <12>

[§4] McCoy’s inventions were an instant success. [C] Not surprisingly, other inventors inundated the market with similar – and usually inferior – devices. [D] Supposedly, factory owners who wanted a product proven to do it <13> would ask if their purchase was “the real McCoy.” McCoy’s inventions would continue to benefit industries in the United States well into the twentieth century, as his name became synonymous with quality and authenticity. <14>

<6>:

A. NO CHANGE

B. lessening the frequency of number

C. subtracting the amount

D. lowering the amount

ANSWER: A

Explanation:

“NO CHANGE” is correct because “reducing the number” is the precise, idiomatic expression for describing a decrease in countable events. Maintenance stops are discrete occurrences: a train either makes a stop or does not. Therefore, their total can properly be described as a *number*, and McCoy’s lubricating device reduced that number by allowing oil to be applied while the train remained in motion. The wording also fits the passage’s factual, explanatory style. It directly connects the invention’s mechanism to its practical result without introducing unnecessary abstraction or repetition. In standard written English, writers commonly use “reduce the number of” with plural count nouns, as in “reduce the number of delays,” “reduce the number of repairs,” or “reduce the number of stops.” This construction clearly communicates that fewer individual maintenance stops were needed. ACT English questions assess whether a revision preserves the intended meaning while maintaining grammatical, clear, concise prose; retaining the original wording does both here. For an overview of the conventions and production-of-writing skills evaluated on the ACT English test, see ACT’s test descriptions and ACT’s score-reporting information.

QUESTION NO: 96

DIRECTIONS: In the passage below, certain phrases are underlined and numbered . The question will present alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is the best, choose "NO CHANGE".

Haiti

[§1] Although my friends and family were skeptical of whether <1> I would be safe, I boarded the plane in New York boldly <2> and flew to Haiti. My college roommate had agreed to take medical supplies to a rural clinic where his brother was a physician, and I agreed to go and help.

[§2] When me and my roommate <3> landed at the airport in the capital Port au Prince, the chaos inside the airport was frightening. Dozens of men approached us while gesturing to our luggage, and yelling at us in Creole. They wanted us to select their taxis. I was thrilled <4> when my roommate smiled at someone who called our names through the crowd.

[§3] Papi, our designated transporter, was a Haitian man in his early twenties who works <5> for the physician. He warmly welcomed us to his country, and seemed to have a great sense of humor. <6> He laughed nonstop during our ride through the capital city. Once we were on the open highway, Papi taught us basic Creole greetings to pass the time during our excessively long four-hour commute. <7>

[§4] The mountainous town where we would spend the week was beautiful, and I immediately fell in love with the place and its people. The views rocked! <8> Even though I could not fluently speak Creole, I made the most of my time with the land and its inhabitants. Several daily tasks kept me busy that week. The medical clinic was a modest two-room building, and their <9> staff needed help reorganizing the supply pantry. I removed, counted, sorted, and restocked supplies, <10> before adding the additional resources we brought from the United States. After I cleaned and organized the supply pantry, I assisted a visiting nutritionist with distributing vitamins to the locals. <11>

[§5] Each evening, two dozen young children would sit on the porch where my roommate and I stayed. They laughed constantly, they <12> always found joy in the simplest of things. They did teach <13> us to count in Creole and read children’s stories to us in French. They invited us to kick balls with them and chase yard chickens. Even though they did not have many toys, the children entertained one another with conversation, laughter and storytelling.

[§6] When it was time to leave Haiti and return to New York, I was sad to say goodbye. Although my roommate and I delivered medical supplies to their community, the people gave us memories that will last the rest of our lives. <14>

Which choice most strongly suggests that the experience in Haiti was a positive one for the writer?

A. thrilled when my roommate smiled

B. they laughed constantly

C. I was sad

D. memories that will last

ANSWER: D

Explanation:

memories that will last most strongly conveys that Haiti was a positive experience for the writer because it appears in the concluding reflection and summarizes the lasting personal value of the trip. The writer contrasts the tangible medical supplies that she and her roommate brought to the community with the meaningful, enduring memories the community gave them. This emphasis shows that the visit was not merely a completed volunteer task; it became a memorable and emotionally significant experience. The phrase “will last the rest of our lives” is especially strong because it signals gratitude and a deep appreciation for the people, relationships, and experiences encountered in Haiti. A conclusion that highlights lasting memories gives the passage a positive final impression and directly answers the question about the writer’s overall view of the trip. ACT English questions commonly assess how a sentence or phrase contributes to a passage’s purpose, emphasis, and conclusion; here, this language best reinforces the writer’s favorable overall perspective. See ACT’s overview of the English test at https://www.act.org/content/act/en/products-and-services/the-act/test-preparation/description-of-tests/english.html and its preparation resources at https://www.act.org/content/act/en/products-and-services/the-act/test-preparation.html.

QUESTION NO: 97

Gil drives five times farther in 40 minutes than Warrick drives in 30 minutes. If Gil drives 45 miles per hour, how fast does Warrick drive?

A. 6 mph

B. 9 mph

C. 12 mph

D. 15 mph

E. 30 mph

ANSWER: C

Explanation:

The correct answer is **12 mph**. Because the speeds are expressed in miles per hour, first convert Gil’s 40-minute driving time to hours: 40 minutes is $\frac{2}{3}$ hour. Gil therefore travels $45 \times \frac{2}{3} = 30$ miles. The statement says that this distance is five times the distance Warrick travels, so Warrick travels $30 \div 5 = 6$ miles. Warrick’s 30-minute driving time is $\frac{1}{2}$ hour. Speed equals distance divided by time, giving $6 \div \frac{1}{2} = 12$ miles per hour. Thus, Warrick drives 12 mph. This solution uses the standard rate relationship, distance = rate × time, while maintaining consistent units before calculating. Converting minutes to hours is essential whenever a rate is given in miles per hour. ACT Math questions commonly assess proportional reasoning and the ability to apply rates with appropriate units; see the ACT Math practice resources and the ACT score and skills information.

QUESTION NO: 98

HUMANITIES: This passage is adapted from the article “The Quiet Sideman” by Colin Fleming (©2008 by The American Scholar)

(1) Near the end of his eight years as a recording-session musician, tenor saxophonist Leon “Chu” Berry landed a short-lived spot with Count Basie’s orchestra. Standing in for one of the Basieband’s two tenor giants, Berry took a lead solo on “Oh,

Lady Be Good," the 1924 Gershwin song that Basie had played for years. In the 28 seconds that the solo lasted on February 4, 1939, we are treated to no less than the musical personification of mind and body working together in divine tandem. When you hear the recording for the first time, you're likely to wonder why you've never heard of Chu Berry before.

(2) Why you've never heard of him is pretty simple: a lot of hard-core jazz buffs don't know much about him. Berry was a solid session player who turns up on recordings with Basie,

Bessie Smith, Fletcher Henderson, and Billie Holiday. But he did not cut many sessions himself as a leader, and when he soloed, he worked within the recording constraints of the era and the swing genre – fast-moving 78s with solos often lasting for a mere 32 beats.

(3) The people who loved Berry were, not surprisingly, other tenor players, a situation leading to the dreaded "musician's musician" tag. But that's not nearly praise enough to describe Chu Berry,who, when given opportunity, displayed a musical dexterity that would be envied by future generations of horn men.

(4) Berry faced the lot of other horn players: having to grind it out long and hard until something memorable burst through; the prejudices and expectations of the listening public; and the acceptedwisdom of what is and isn't art in a given medium. In this case, swing was fodder for dance parties, not music worthy of study.

(5) Oddly enough, Berry's geniality might help explain his failure to court history's favor: it wasn't in his nature to call attention to himself or his playing. Born in 1908 into the black middle class inWheeling, West Virginia, the laid-back, affable Berry attended West Virginia State in Charleston, where he switched from alto sax to tenor and exhibited the willingness to fit in that characterized his presence in so many dance bands. He was the rare artist who refused to put his interests above those of the band, even if that meant playing ensemble passages rather than taking a healthy allotment of solo breaks.

(6) College proved a training ground for Berry the bandsman, as he teamed up with a number of amateur outfits. He never played simply to show off. Instead, he tried to bring out the positiveattributes in any given situation or setting. Later, when Berry is performing with the Calloway ensemble, we hear some ragged, out-of-tune playing until Berry's first few solo notes emerge. The other players, no longer languidly blowing through their charts, immediately surge up behind him, all fighting-fit. Once Berry finishes his solo, the shenanigans resume.

(7) After making his way to New York, Berry immediately became a presence and soon was in demand. The great jazz orchestras of the swing era were fronted by musical directors/arrangers –

Duke Ellington was preeminent – who drew the acclaim. The sidemen were musical traveling salesmen who sold someone else's wares in the best style they could manage. It was with Fletcher Henderson that Berry began to ditch some of the sideman's subservient trappings. For starters, Henderson wrote in keys that were rare for the jazz orchestras of the day, and his somber, indigo-inflected voicings were ideal for a player of Berry's introspective approach to his instrument: Berry sounds as if he's being swallowed by his sax. "Blues in C Sharp Minor," for instance, is odd, haunting, and ultimately relaxing. A Berry solo in it is slightly off mike, making the listener feel as though he's been playing for some time before we finally hear him. The effect is unnerving, as if we weren't paying close attention.

(8) In June 1940, Cab Calloway granted Berry a showcase piece, "A Ghost of a Chance," the sole recording in Berry's career to feature him from start to finish. It was his "Body and Soul," aresponse to Coleman Hawkins's famous recording, intended not as a riposte to a rival, but as the other half of a dialogue. Its rubato lines are disembodied from the music meant to accompany it, which is spartan to begin with. This may be Berry's one and only instance of indulgence on a record, a cathedral of a solo in its flourishes, angles, ornamentations, reflexivity. If sunlight could pass through music, "A Ghost of a Chance" would funnel it out in the broadest spectrum of colors.

The author points out that many serious jazz enthusiasts know little about Berry primarily in order to:

A. criticize scholarship that has provided an unbalanced history of jazz.

B. demonstrate that the author is more knowledgeable than most jazz scholars.

C. illustrate the secrecy Berry demanded in order to preserve his family's privacy

D. explain why it's likely that readers would be unfamiliar with Berry.

ANSWER: D

Explanation:

The correct answer is *explain why it's likely that readers would be unfamiliar with Berry.* The opening paragraph anticipates a reader's reaction to Berry's remarkable solo: after hearing it, the reader may wonder why Berry is not already well known. The next paragraph directly addresses that question, stating that even dedicated jazz listeners may know little about him.

The author then supplies the relevant context: Berry was principally a session musician, appeared on other artists' recordings, made relatively few recordings as a leader, and performed in an era and genre where recorded solos were often extremely brief. These details establish why a highly skilled performer could have left a smaller public profile than more prominently featured bandleaders or soloists. The passage develops this same idea further by describing Berry as a sideman who did not seek attention and who often subordinated his own opportunities for solos to the needs of the ensemble. Thus, mentioning the limited knowledge of serious jazz enthusiasts frames the article's central purpose: introducing and restoring attention to an underrecognized musician. This question tests identifying an author's rhetorical purpose through the relationship between the first paragraph's implied reader question and the explanation that immediately follows. For ACT Reading guidance on using textual evidence and understanding a passage's purpose, see ACT's test description and Preparing for the ACT.

QUESTION NO: 99

Why Has Single Motherhood Increased?

(1) Changes in children's living arrangements result from long-standing trends in marriage, divorce, and fertility. Divorce rates in the United States have been going up since the turn of thecentury and have recently stabilized at very high levels. Out-of-wedlock birth rates have been going up gradually since at least the early 1940s. After 1960, the age of women at their first marriages began to rise, increasing the proportion of young women who might become unwed mothers. Together, these forces have fueled the growth of single parenthood during the postwar period.

(2) These trends exist in all western, industrialized countries. Divorce rates more than doubled in most countries between 1960 and 1990; in some they increased fourfold. Single parenthood alsoincreased in nearly all western countries between 1970 and the late 1980s. Yet the U.S. has the highest prevalence of single-parent families, and it has experienced the largest increase between 1970 and 1990.

(3) In the view of conservatives, welfare benefits in the United States have reduced the costs of single motherhood and discouraged young men and women from marrying. In some parts of thecountry, welfare may provide poor women with more economic security than marriage does. However, for three reasons, the argument that welfare caused the growth in single-parent families does not withstand scrutiny.

(4) The trend in welfare benefits between 1960 and 1990 does not match the trend in single motherhood. Welfare and single motherhood both increased dramatically during the 1960s and early1970s. After 1974, however, welfare benefits declined, but single motherhood continued to rise. The real value of the welfare benefit package (cash assistance plus food stamps) for a family of four with no other income fell from $10,133 in 1972 to $8,374 in 1980 and to $7,657 in 1992, a loss of 26 percent between 1972 and 1992 (in 1992 dollars).

(5) Increases in welfare cannot explain why single motherhood grew among more advantaged women. Since 1960, divorce and single parenthood have grown among women with a collegeeducation, who are not likely to be motivated by the promise of a welfare check.

(6) Welfare payments cannot explain why single motherhood is more common in the United States than in other industrialized countries. Nearly all the Western European countries have muchmore generous payments for single mothers than the U.S., yet the prevalence of single motherhood is lower in these countries. One way to compare the "costs" of single motherhood in different countries is to compare the poverty rates of single mothers with those of married mothers. While single mothers have higher poverty rates than married mothers in all industrialized countries, they are worst off in the United States.

(7) If welfare is not to blame, what is? Three factors seem to be primarily responsible.

(8) The first is the growing economic independence of women. Women who can support themselves outside marriage can be picky about when and whom they marry. They can leave badmarriages and they can afford to bear and raise children on their own. Thus, single mothers will be more common in a society where women are more economically independent, all else being equal.

(9) American women have moved steadily toward economic independence throughout this century thanks to increased hourly wages, greater control over child-bearing, and technologicaladvances that reduce time required for housework. Since the turn of the century, each new generation of young women has entered the labor force in greater proportions and stayed at work longer. By 1970, over half of all American women were employed or looking for work; by 1990, nearly three quarters were doing so. The rise in welfare benefits during the 1950s and 1960s may have made poor women less dependent on men by providing them with an alternative source of economic support. However, welfare was only a small part of a much larger change that was enabling all women, rich and poor alike, to live more easily without a husband.

(10) A second factor in the growth of single motherhood is the decline in men's earning power relative to women's. After World War II and up through the early 1970s, both men and womenbenefitted from a strong economy. While women were becoming more self-sufficient during the 1950s and 1960s, men's wages and employment opportunities were increasing as well.

Consequently, while more women could afford to live alone, the economic payoff from marriage continued to rise. After 1970, however, the gender gap in earnings (women's earnings divided by men's earnings) began to narrow. In 1970, female workers earned 59 percent as much as male workers; by 1980, they earned 65 percent as much and by 1990 74 percent. (These numbers, which come from a study by Suzanne Bianchi to be published by the Russell Sage Foundation, are based on full-time workers between the ages of 25 and 34.) In just two short decades, the economic payoff from marriage had declined by 15 percentage points. Such reductions are likely to increase single motherhood.

(11) The narrowing of the wage gap occurred among adults from all social strata, but the source of the narrowing varied. Among those with a college education, men were doing well, but womenwere doing even better. Between 1980 and 1990, the earnings of college-educated women grew by 17 percent, while the earnings of college-educated men grew by only 5 percent. (Again, I am referring to full-time workers, aged 25 to 34). Thus, even though the benefits of marriage were declining, women still had much to gain from pooling resources with a man.

The last paragraph differs from the first paragraph in that in the last paragraph the author:

A. Hones in on a specific set of data rather than offering a bird's-eye view.

B. Describes the problem of single motherhood as a whole.

C. Indicates women still have something to gain from traditional marriage.

D. Decries the continuing wage gap in America.

ANSWER: A

Explanation:

"Hones in on a specific set of data rather than offering a bird's-eye view." is correct because the two paragraphs operate at distinctly different levels of scope. The first paragraph introduces the passage's broad subject: long-term changes in marriage, divorce, fertility, and women's age at first marriage. It summarizes several nationwide trends over an extended period and uses those trends to establish the general growth of single parenthood. The last paragraph, by contrast, narrows the discussion to a particular subgroup—college-educated adults aged 25 to 34—and a limited time span, 1980 to 1990. It then supplies precise comparative earnings figures for college-educated women and men. This focused evidence develops a more refined point within the larger discussion of the wage gap and marriage's economic benefits. Identifying this shift from an overview to a specific illustration is an ACT Reading rhetorical-structure skill: readers compare the purpose, focus, and evidence used in different parts of a passage rather than merely matching repeated topic words. See ACT's overview of the Reading section at ACT Reading Test and its general test-preparation resources at ACT Test Preparation.

QUESTION NO: 100

Lorna noticed that the amount of time needed to boil water was related to the shape of container she was using. She decided to measure the time necessary to bring 500 ml of water at room temperature to a boil on preheated hotplates. She used five cylindrical 500 milliliter Pyrex glass containers, each having the same wall thickness but a different base radius and height. In other words, some containers were narrow and long, others were wide and shallow. This is the table she prepared to record her data.

Container	Radius [cm]	Height [cm]	Volume [ml]	Time to Boil [min]
1	2.0	75.0	300	
2	3.4	26.0	300	
3	4.0	18.8	300	
4	5.0	12.0	300	
5	1.0	3.0	300	

She placed each container containing the same amount of water on a hotplate, and placed a thermometer in each one to monitor the temperature. She noticed that the temperature was increasing faster in the containers with a larger radius. After some time, she observed boiling in the 10 cm radius container. She was about to record the time in the table she had set up, but noticed that there seemed to be less water in that container than she originally put in. She transferred the water into a graduated cylinder, and indeed found that the volume was below 300 ml. She proceeded with her experiment. The boiling in container 5 was followed by boiling in containers 4, 3, 2, and 1, in that order. Lorna checked the volume of the water in each container and found that it was lower than 300 ml. She also found that the decrease in volume was highest in the container with the largest radius. In container 1, volume decrease was barely detectable. While the decrease in volumes prevented her from getting meaningful data on boiling, they gave her an idea of how container shapes affect boiling times. In addition, she got an idea for her next project – evaporation from containers of different shapes.

From the passage it can be inferred that a graduated cylinder is used:

A. by students only.

B. to measure how cylindrical a container is.

C. to measure the rate of evaporation of water.

D. to measure volumes.

ANSWER: D

Explanation:

“to measure volumes.” is correct. The passage directly describes Lorna transferring water from a container into a graduated cylinder and determining that the amount remaining was below 300 mL. That observation required a tool designed to measure the volume of a liquid accurately. A graduated cylinder has volume markings, typically in milliliters, that allow an observer to determine how much liquid it contains. Here, Lorna uses the measurement to confirm that water volume decreased while the water was heated, which helps her identify evaporation as a factor affecting her boiling-time investigation. Because each container began with 500 mL, measuring the remaining liquid volume also lets her compare the extent of water loss among containers of different shapes. This use is consistent with standard laboratory practice: graduated cylinders are intended for measuring liquid volume rather than for determining an object’s shape or identifying who uses the equipment. The OpenStax Chemistry measurement overview describes graduated cylinders as common apparatus for measuring liquid volumes, and the National Institute of Standards and Technology volume guidance explains the use of liters and milliliters as units of volume.

QUESTION NO: 101

Background Information

If a characteristic is expressed in an organism, that is the organism’s phenotype. The genes that determine that phenotype are called the organism’s genotype. A characteristic is determined by the organism’s genes that were passed down by the parents. If a gene is dominant, that gene will be expressed in the phenotype. If a gene is recessive, it will only be expressed in the phenotype when two recessives are present in the genetic makeup of that organism.

Description

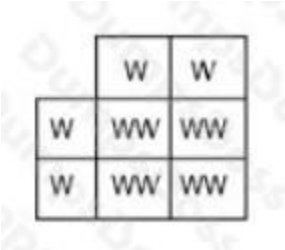
A cat breeder is losing money because customers are buying cats that do not have white paws, and the cat breeder has mostly white-pawed cats. She decides to experiment with breeding with the six remaining cats that do not have white paws to see if she can produce litters of kittens without white paws. A cat without white paws can be either pure for the non-white pawed cats (homozygote) or a carrier for white paws (heterozygote). The trait for having white paws is recessive.

A homozygote for the non-white = WW (non-white cat paws).

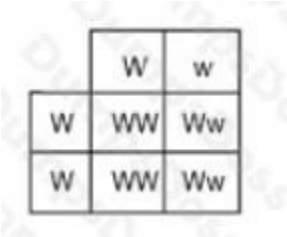
A heterozygote for white = Ww (non-white cat paws). A homozygote for the white = ww (white cat paws).

You can create Punnett Squares to show the phenotypes that would result from two parent cats breeding.

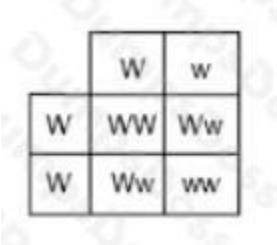
WW × WW cross yields all non-white pawed kittens.



WW × Ww cross yields all non-white pawed kittens in the first generation; however, 1/2 will be carriers for white paws.



Ww × Ww cross yields a ratio of 1 homozygote non-white paws to 2 heterozygote to 1 homozygote white paws for the first generation.



Experiment

Group 1

The cat breeder breeds two cats that do not have white paws. She finds that the first generation of kittens in this group does not have any white paws. When the first generation of cats was bred, she finds that the second generation of these kittens is 1/8 white-pawed and 7/8 not white-pawed.

Group 2

The cat breeder breeds two different cats that do not have white paws. She finds that the first, second, and third generations of kittens in this group did not have any white paws.

Group 3

The cat breeder breeds two different cats that do not have white paws. She finds that the first generation of kittens in this group has 1/4 with white paws and 3/4 without white paws. She does not breed for a second generation in this group.

Describe the most likely genetic makeup of the parents in Group 1.

A. The cats were both pure for not having white paws.

B. One cat was pure, while the other cat was a carrier for the white paw trait.

C. Both cats were carriers for the white paw trait.

D. It cannot be determined.

ANSWER: B

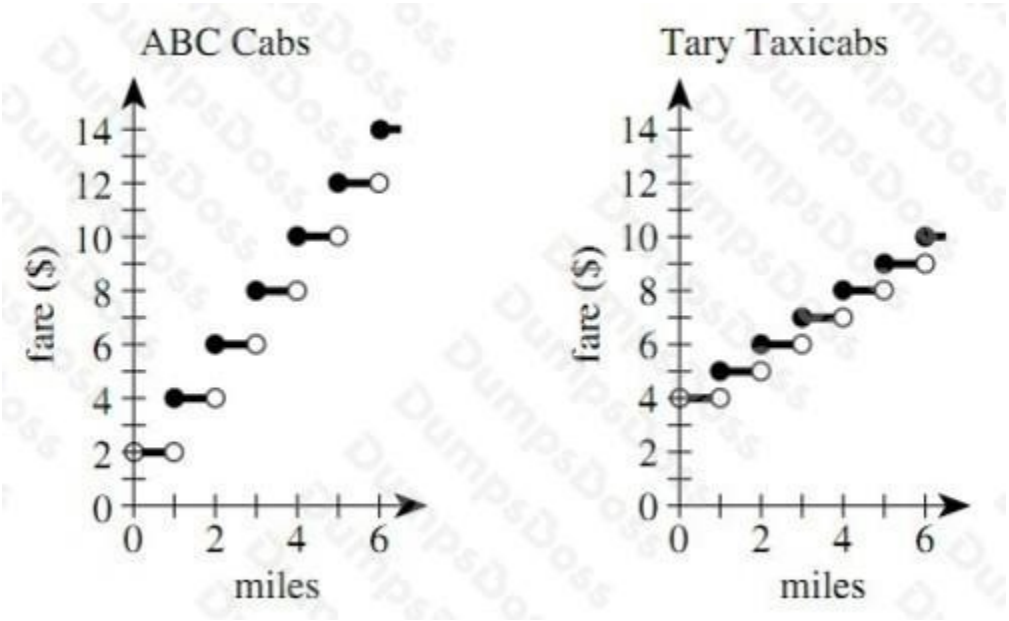
Explanation:

One cat was pure, while the other cat was a carrier for the white paw trait. The parental cross is therefore WW × Ww. Because W is the dominant non-white-paw allele, every first-generation kitten receives at least one W allele and has non-white paws. At the same time, the carrier parent can pass its recessive w allele to approximately half of those kittens, producing Ww kittens that look non-white-pawed but carry the white-paw allele.

The appearance of white-pawed kittens in the next generation shows that the recessive allele persisted among the first-generation cats. A white-pawed kitten must have genotype ww, which requires it to inherit a w allele from each parent. Thus, the Group 1 observations support an original cross that produced non-white-pawed offspring while introducing carriers into that generation. In real breeding data, observed fractions can differ from ideal Punnett-square proportions because litters are finite and because the particular first-generation cats selected for breeding affect the result. Mendelian inheritance and the use of Punnett squares to track dominant and recessive alleles are described by the OpenStax Biology 2e discussion of traits and the National Human Genome Research Institute definition of dominant traits.

QUESTION NO: 102

ABC Cabs and Tary Taxicabs both have an initial fare of a whole number of dollars for 1 passenger. The fare increases a whole number of dollars at each whole number of miles traveled. The graphs below show the 1-passenger fares, in dollars, for both cab companies for trips up to 6 miles. When the fares of the 2 cab companies are compared, what is the cheaper fare for a 5-mile trip?



A. $8

B. $9

C. $10

D. $11

E. $12

ANSWER: B

Explanation:

$9 is the cheaper fare for a 5-mile trip. To answer a comparison question based on two graphs, locate 5 on the horizontal axis, which represents miles traveled. From that position, identify the fare shown by each cab company's graph at the same mileage. The relevant values must be compared directly because the question asks for the lower of the two 5-mile fares, not for an initial fare, a rate of increase, or the difference between the companies' prices. The lower plotted fare at 5 miles is $9, so that is the amount a passenger would choose when seeking the less expensive cab for that trip. This uses the essential graph-reading process tested in ACT mathematics: match the stated input value to the horizontal axis, read the associated output from the vertical axis, and interpret the result in the context supplied by the problem. The fact that fares change by whole-dollar amounts at whole-mile intervals supports reading a discrete dollar value from the graph. ACT's official mathematics preparation materials emphasize interpreting graphs and using quantitative information in context; see ACT Math Practice Questions and Preparing for the ACT.

QUESTION NO: 103

Three studies examined how the volume of runoff from melting ice is affected by wind speed and by the presence of sand beneath the ice.

In a lab kept at 18°C, runoff was collected from a plastic box containing melting ice. The box was tilted at 10° and had horizontal openings in its lower end. After flowing through the openings, the runoff fell into a trough (see diagram) and was conveyed to a measuring device.

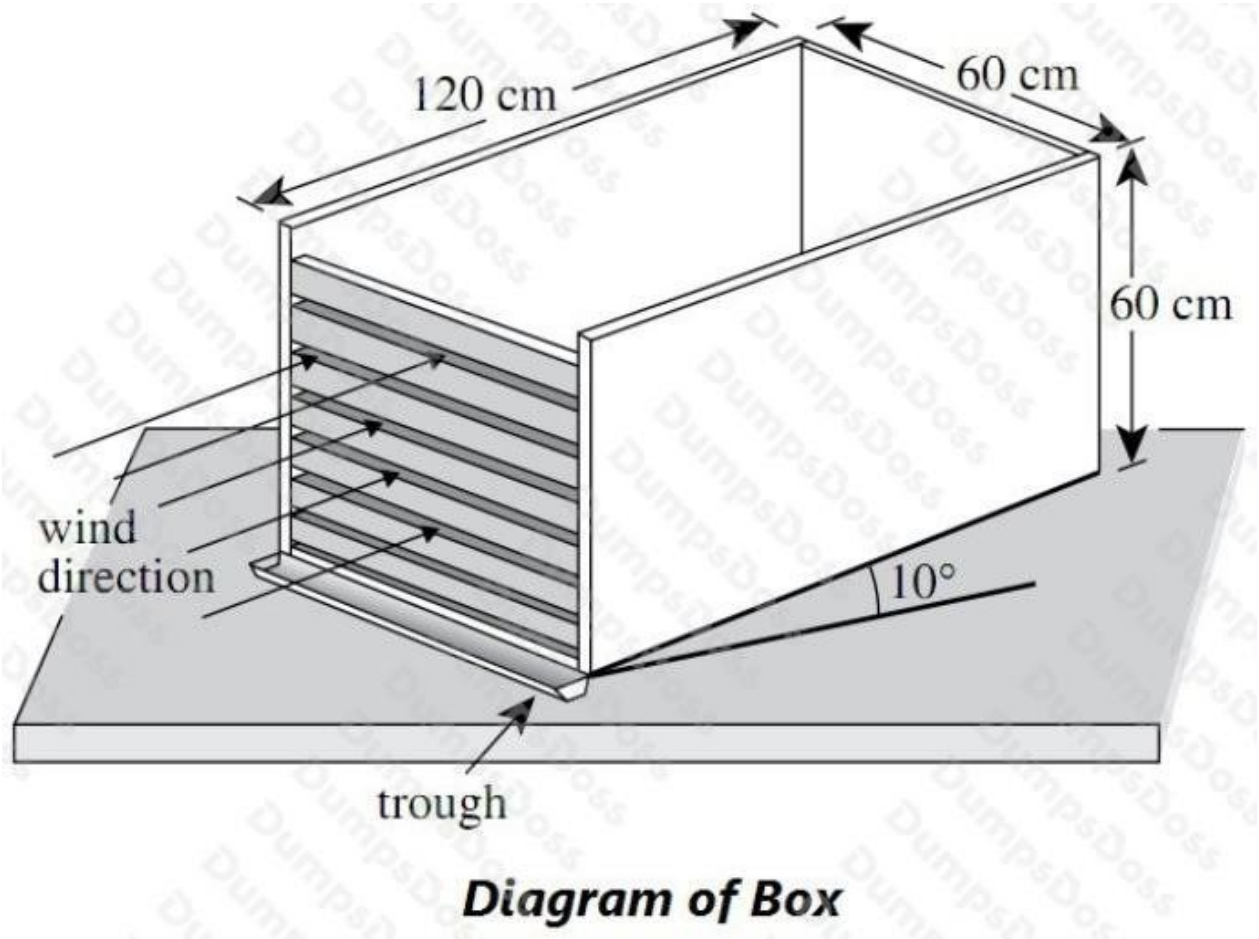


Diagram of Box

Study 1

In each of the first 3 of 4 trials, the following steps were carried out:

1. A 30 cm deep layer of a particular clean, dry sand was placed in the box.

2. A 30 cm deep layer of chipped ice (density 0.4 g/cm3) was placed in the box on top of the layer of sand.

3. A fan was turned on to blow air at a constant speed onto the trough end of the box.

4. For the next 600 min, the volume of runoff collected over each 20 min period was measured.

The wind speed was 2.5 m/sec, 1.0 m/sec, and 0.5 m/sec in the first, second, and third trials, respectively.

In the fourth trail, all steps except Step 3 were carried out. (The fan was not turned on).

The results of the 4 trials are shown in Figure 1.

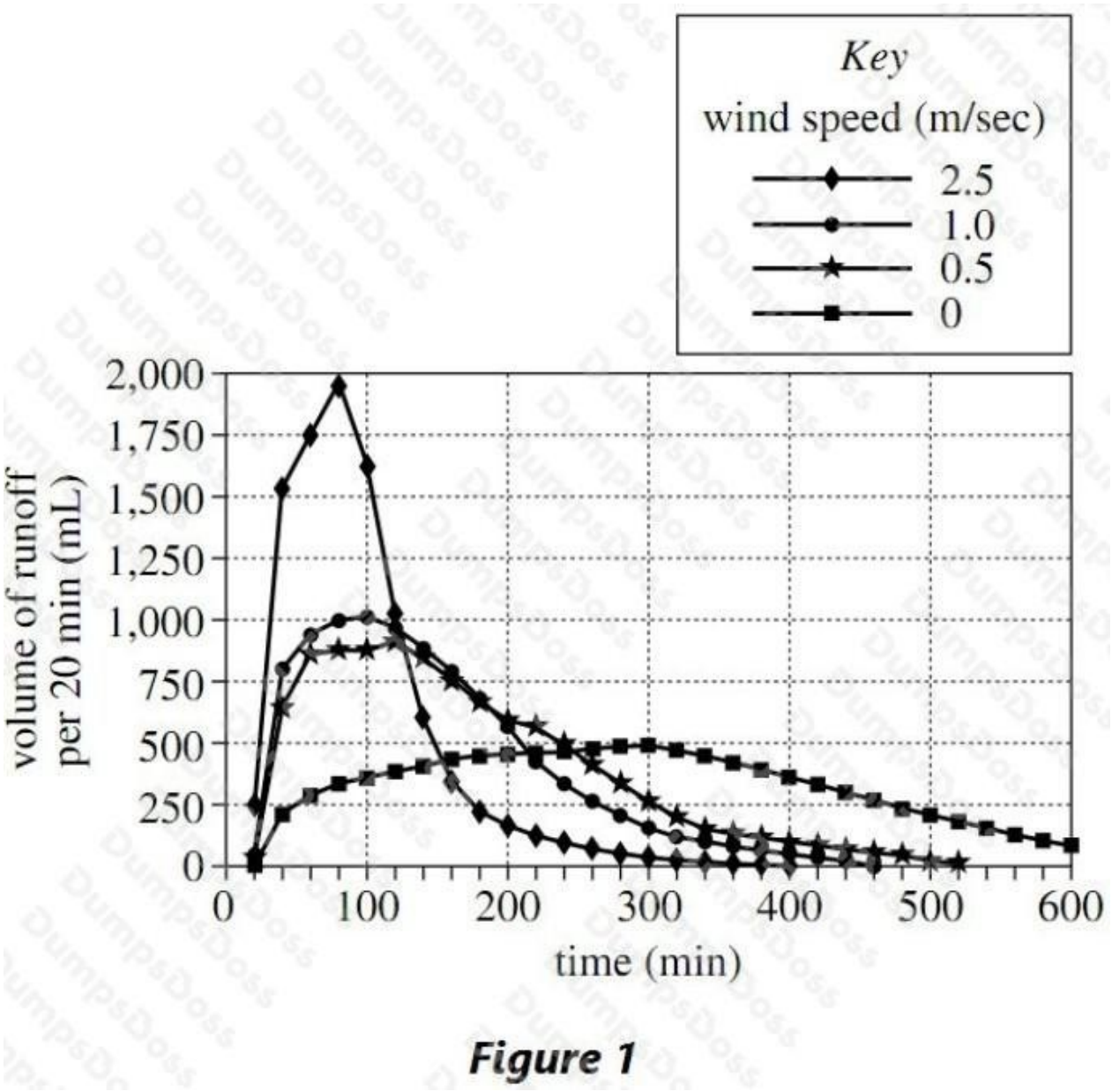


Figure 1

Study 2

The second trial of Study 1 was repeated. Then the second trial of Study 1 was again repeated, except that Step 1 was omitted. (No sand layer was placed in the box.) The results of the 2 trials are shown in Figure 2.

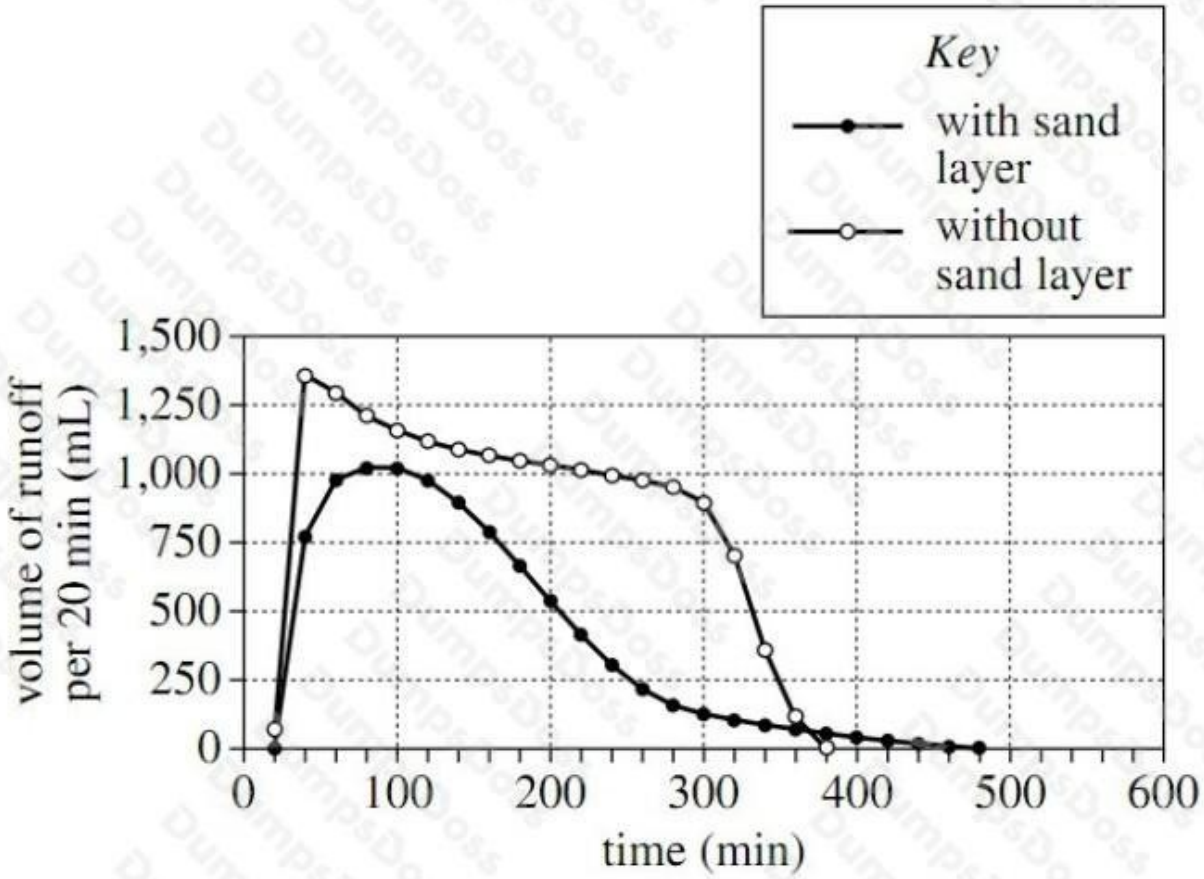


Figure 2

Figures adapted from Masahiko Hasebe and Takanori Kumekawa, "The Effect of Wind Speed on the Snowmelt Runoff Process: Laboratory Experiment." ©1994 by International Association of Hydrological Sciences Publishing.

According to the results of Study 1, for which of the wind speeds did the runoff volume per 20 min decrease to zero from its maximum value before 500 min?

A. 0 m/sec only

B. 2.5 m/sec oily

C. 0.5 m/sec and 1.0 m/sec only

D. 1.0 m/sec and 2.5 m/sec only

ANSWER: D

Explanation:

1.0 m/sec and 2.5 m/sec only is correct. This question requires direct interpretation of Figure 1, specifically tracking each trial's plotted runoff volume over time. For the 2.5 m/sec trial, the runoff volume rises to its highest plotted value and subsequently declines until it reaches zero before the 500-minute mark. The 1.0 m/sec trial follows the same relevant pattern: after attaining its maximum runoff volume, its plotted value decreases to zero before 500 minutes. Therefore, both of these wind speeds satisfy every part of the question: the runoff first reaches a maximum and then falls to zero within the stated time limit.

The wording “from its maximum value” is important because it asks for trials in which the curve has already reached its highest runoff amount and later returns to the zero-runoff line. The 500-minute threshold is equally important; the graph must show the zero value occurring earlier than, rather than at or after, 500 minutes. This is the type of evidence-based graph-reading task assessed in the ACT Science section: identify the relevant variables, locate the specified time interval, and compare the plotted results without introducing assumptions beyond the figure. See ACT’s Science test preparation guidance and its Preparing for the ACT guide.

QUESTION NO: 104

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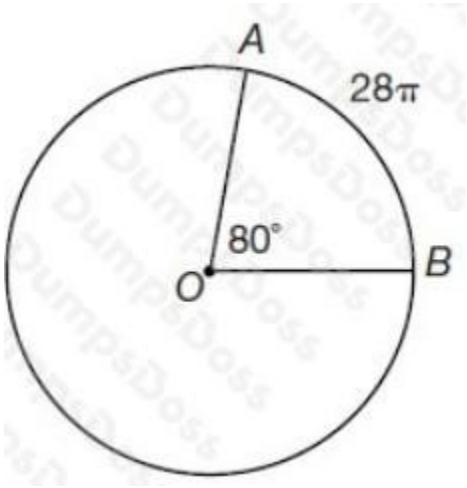

In the circle above, the measure of angle AOB is 80° and the length of arc AB is 28π units. What is the radius of the circle?

A. 63

ANSWER: A

Explanation:

The correct answer is 63. An arc length is the same fraction of the full circumference as its central angle is of 360°. Since angle AOB measures 80°, arc AB represents 80/360, which simplifies to 2/9, of the circle’s circumference. The circumference is 2πr, so the arc-length equation is (2/9)(2πr) = 28π. This simplifies to 4πr/9 = 28π. Dividing both sides by π gives 4r/9 = 28, and multiplying by 9/4 gives r = 63. Therefore, the circle has a radius of 63 units. This uses the standard arc-length relationship, which can also be written as s = (θ/360) × 2πr when the central angle θ is measured in degrees. See the OpenStax circle formulas reference and the Math Is Fun explanation of sectors and arc length.

QUESTION NO: 105

If y = −6, what is the value of (y3 − 40) / (y − 2)?

A. −32

B. 32

C. 0

D. 64

ANSWER: B

Explanation:

The correct answer is **32**. In standard ACT-style plain-text notation, *y3* is intended to represent *y³*, so substitute −6 for y in the expression: (y³ − 40)/(y − 2). Cubing −6 gives −216. The numerator is therefore −216 − 40 = −256, and the denominator is −6 − 2 = −8. Dividing −256 by −8 produces a positive result because the quotient of two negative numbers is positive: 256 ÷ 8 = 32. Thus, the value of the expression is 32. This problem tests careful substitution, evaluation of an exponent with a negative base, and division of signed numbers. Parentheses are especially important when evaluating the cube: (−6)³ = −216. The ACT math section expects students to apply these core algebraic operations accurately and efficiently. ACT's official mathematics guidance identifies working with expressions and number operations as foundational skills; see ACT Math Practice Questions and the Preparing for the ACT guide.