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Topic Break Down

Topic	No. of Questions
Topic 1, Applied Math	150
Total	150

QUESTION NO: 1

An elevator has a maximum weight capacity of two tons. What is the greatest number of people, each weighing 170 pounds that can ride in the elevator without exceeding the maximum capacity?

A. 10

B. 11

C. 12

D. 23

E. 24

ANSWER: D

Explanation:

The correct answer is **23**. In customary U.S. weight measurements, one ton is 2,000 pounds, so an elevator rated for two tons has a maximum capacity of 4,000 pounds. This use of the short ton is consistent with the U.S. customary definition given by the National Institute of Standards and Technology: NIST unit-conversion information. Next, divide the elevator's 4,000-pound limit by the 170-pound weight of each person: 4,000 ÷ 170 = approximately 23.53. Because the question asks for the greatest whole number of people who can ride without exceeding the stated capacity, the result must be rounded down rather than rounded to the nearest whole number. Twenty-three people weigh 3,910 pounds, which remains within the 4,000-pound maximum. This calculation applies the practical WorkKeys mathematics approach of interpreting the units, performing the division, and choosing a whole-number result that satisfies the stated limit. ACT describes WorkKeys Applied Math as assessing workplace math problems involving quantities and constraints: ACT WorkKeys Applied Math.

QUESTION NO: 2

It takes 40 minutes to fly from Toledo to Cincinnati. It takes 140 minutes to fly from Cincinnati to Atlanta. How long are the combined flights?

A. 1 hours

B. 2 hours

C. 3 hours

D. 4 hours

E. 5 hours

ANSWER: C

Explanation:

The correct combined flight time is **3 hours**. Because both flight durations are stated in minutes, first add them using the same unit: 40 minutes plus 140 minutes equals 180 minutes. Then convert the total to hours. There are 60 minutes in 1 hour, so 180 minutes divided by 60 minutes per hour equals 3 hours. This calculation represents only the time spent flying on the two flight segments: Toledo to Cincinnati and Cincinnati to Atlanta. No layover, boarding, taxiing, or other travel time is included because none is specified in the question. A reliable approach for workplace-math questions is to combine quantities that use the same unit first and then convert the result only when needed. The ACT describes WorkKeys Applied Math as assessing the ability to apply mathematical reasoning to workplace situations; see ACT WorkKeys Applied Math. For the standard relationship between hours and minutes, see NIST's SI Units of Time reference.

QUESTION NO: 3

Dana is going to plant 6 new rosebushes in her yard. Each rosebush costs $12.95. How much will Dana pay for all 6 plants?

A. $2.16

B. $41.70

C. $52.95

D. $77.70

E. $103.60

ANSWER: D

Explanation:

Dana will pay **$77.70**. The problem gives a unit price of $12.95 for each rosebush and states that Dana is buying 6 rosebushes. To find a total cost when every item has the same price, multiply the number of items by the price per item: 6 × $12.95. Multiplying 12.95 by 6 gives 77.70, so the total is $77.70. The decimal point must be placed so that the result remains a dollar amount with two digits for cents. This calculation represents repeated addition of the same price six times: $12.95 + $12.95 + $12.95 + $12.95 + $12.95 + $12.95 = $77.70. This is the kind of everyday workplace calculation assessed in the Applied Math component of ACT WorkKeys, where examinees select and apply the appropriate mathematical operation to practical situations. More information about the assessment is available from ACT WorkKeys Applied Math. For general guidance on multiplying decimal values, see Khan Academy's decimal multiplication example.

QUESTION NO: 4

The table below shows Wyatt's bird watching data that he collected during one week. How many birds did he see on Monday?

Day	Number
Monday	
Tuesday	12
Wednesday	7
Thursday	4
Friday	11
Mean	8

A. 5 birds

B. 6 birds

C. 7 birds

D. 8 birds

E. 10 birds

ANSWER: B

Explanation:

The correct answer is **6 birds**. To answer a question based on a data table, first locate the row or column labeled “Monday.” Then read the value in the table cell that corresponds to that day. Wyatt’s recorded total for Monday is 6, so he saw 6 birds on Monday. This type of question measures the ability to find and use information presented in a workplace-style graphic rather than perform a complicated calculation. The key is to match the requested day with its recorded quantity and report that quantity with the appropriate unit, birds. ACT describes the WorkKeys Applied Math assessment as using workplace situations that require examinees to identify relevant information and select an appropriate response; careful reading of tables, charts, and other presented information supports that same practical skill. For additional information about the WorkKeys system and its assessments, see ACT WorkKeys for Job Seekers and ACT WorkKeys for Employers.

QUESTION NO: 5

Charter Pools is installing a new circular pool in a customer’s backyard. The customer has a well and is not able to fill the pool. Charter Pools will haul in water, but they need to determine how many gallons of water they will need. The truck can carry 6500 gallons of water. The pool is 27 feet in diameter and 54 inches deep. How many gallons are needed to fill the pool?

A. 535 gallons

B. 2576 gallons

C. 19,264 gallons

D. 30,902 gallons

E. 924,661 gallons

F. 60,600 gallons

ANSWER: F

Explanation:

The pool’s capacity is found by treating it as a cylinder. First, convert the depth to feet so that all measurements use the same unit: 54 inches equals 4.5 feet. The radius is half the 27-foot diameter, or 13.5 feet. Using the cylinder-volume formula, volume = $\pi r^2 h$, gives $\pi \times (13.5\text{ ft})^2 \times 4.5\text{ ft}$ = approximately $2{,}578.5\pi$ cubic feet, or about 8,101 cubic feet. A U.S. gallon is defined as 231 cubic inches, which is equivalent to approximately 7.48052 gallons per cubic foot. Multiplying 8,101 cubic feet by 7.48052 gallons per cubic foot gives approximately 60,595 gallons. Since the measurements and answer choices are expressed as practical whole-gallon estimates, 60,600 gallons is the appropriate result. This quantity would require multiple truckloads because each truck holds 6,500 gallons. The calculation uses the standard cylinder-volume relationship and a consistent conversion from cubic feet to U.S. gallons. See the National Institute of Standards and Technology volume-unit guidance and the NIST SI unit resources for unit-conversion references.

QUESTION NO: 6

Dr. Kennedy ordered the following medical supplies and received a 25% discount on his total purchase price. He will have to pay 9% sales tax on the cost of the items plus $12.95 shipping. How much will Dr. Kennedy pay for this purchase?

Number	Description	Price
1	Otoscope	$175.00
5	BP cuff	$25.65 each
6	Thermometer	$30.00 each
10	Cases of syringes	$5.00 each

A. $356.32

B. $446.51

C. $448.88

D. $533.25

E. $739.50

ANSWER: C

Explanation:

$448.88 is correct. The listed medical supplies total $533.25. First apply the 25% discount to the item total: a 25% discount means Dr. Kennedy pays 75% of $533.25, or $399.9375. Because the amount is money, this discounted merchandise cost is treated as $399.94. Sales tax is then calculated only on the cost of the items after the discount, not on shipping. Multiplying $399.9375 by 9% gives $35.994375, which rounds to $35.99. Adding the discounted item cost and sales tax gives $435.93. Finally, add the separate $12.95 shipping charge: $435.93 + $12.95 = $448.88. This follows the question's stated order of operations: reduce the purchase price by the discount, calculate tax on the items' cost, and then include shipping. WorkKeys Applied Math questions assess using percentages, prices, and multi-step calculations in workplace contexts; see ACT WorkKeys Applied Math. For a general reference on computing a percentage by converting it to a decimal and multiplying, see Khan Academy's percentage word-problem guide.

QUESTION NO: 7

A technician earns $19.60 per hour. During one week, the technician works 38 regular hours and 6 overtime hours. Overtime is paid at time and a half. What are the technician's total gross earnings for the week?

A. $744.80

B. $862.40

C. $921.20

D. $960.40

E. $1,058.40

ANSWER: C

Explanation:

The correct answer is **$921.20**. Regular earnings are 38 hours × $19.60 per hour = $744.80. The overtime rate is time and a half, so $19.60 × 1.5 = $29.40 per hour. Overtime earnings are 6 × $29.40 = $176.40. Adding regular and overtime earnings gives $744.80 + $176.40 = $921.20. This calculation applies the higher overtime rate only to the 6 overtime hours. The U.S. Department of Labor overtime guidance provides general information on overtime pay, and ACT describes workplace calculations in its WorkKeys Applied Math overview.

QUESTION NO: 8

A circular storage area has a diameter of 24 feet. What is the area of the storage area, using 3.14 for π?

A. 75.36 square feet

B. 226.08 square feet

C. 452.16 square feet

D. 904.32 square feet

E. 1,808.64 square feet

ANSWER: C

Explanation:

The correct answer is **452.16 square feet**. The area formula for a circle is πr². The diameter is 24 feet, so the radius is half of that measurement, or 12 feet. Substitute the radius into the formula: 3.14 × 12² = 3.14 × 144 = 452.16 square feet. It is important to use the radius, rather than the diameter, in the area formula. The formula for the area of a circle is reviewed by Math Is Fun.

QUESTION NO: 9

An insurance policy pays 80% of the first $20,000 of a patient's medical expenses, and 60% of the remainder. If the patient's total medical bill is $72,000, how much will the policy pay?

A. $43,200

B. $47,200

C. $62,000

D. $57,600

E. $100,800

ANSWER: B

Explanation:

The correct payment is **$47,200**. The policy uses a tiered payment structure, so the calculation must separate the first $20,000 of expenses from all expenses above that amount. First, calculate 80% of $20,000: $20,000 × 0.80 = $16,000. Next, determine the remaining medical expenses after the first $20,000: $72,000 − $20,000 = $52,000. The policy pays 60% of this remainder, which is $52,000 × 0.60 = $31,200. Finally, add the amounts paid for the two tiers: $16,000 + $31,200 = $47,200. This approach reflects the wording "80% of the first $20,000" and "60% of the remainder"; each percentage applies only to its stated portion of the bill. Such multi-step percentage calculations assess the ability to identify relevant quantities, apply rates accurately, and combine the results, skills aligned with the applied-math focus of ACT WorkKeys. See the ACT WorkKeys overview and OpenStax guidance on percentages.

QUESTION NO: 10

The table below shows the monthly production of wagons for the month of June at four different factories. What was Wauseon's production in the month of June?

June Wagon Production	
Factory	**June Output**
Delta	550
Evergreen	525
Wauseon	
Zansford	445
Total	1880

A. 260 wagons

B. 325 wagons

C. 360 wagons

D. 470 wagons

E. 485 wagons

ANSWER: C

Explanation:

The correct answer is **360 wagons**. To answer this type of workplace-data question, locate the row or entry labeled "Wauseon" in the production table and then read the value shown for the month of June. The value at that intersection is 360, so Wauseon produced 360 wagons during June. This is a direct information-retrieval task: it does not require estimating, combining figures, or calculating a change between months. Accuracy depends on matching the correct factory name with the correct month column before recording the number and its unit. ACT WorkKeys Graphic Literacy questions assess the ability to find and use information presented in tables, charts, and graphs, including identifying specific values from a display. Reading the requested location carefully and retaining the stated unit—wagons—ensures that the response fully answers the question. More information about the assessment's use of workplace graphics is available from ACT WorkKeys Graphic Literacy and the ACT WorkKeys overview.

QUESTION NO: 11

Find the area of a solar cover for a circular swimming pool with a radius of 13 feet, to the nearest whole number.

A. 82 ft2

B. 133 ft2

C. 265 ft2

D. 531 ft2

E. 2123 ft2

ANSWER: D

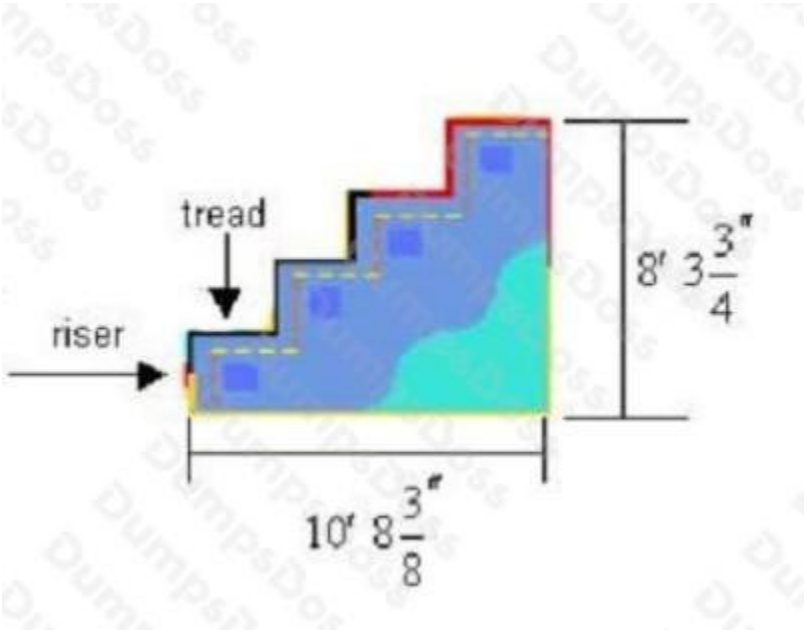
Explanation:

The correct answer is **531 ft2**. A solar cover for a circular pool must cover the pool's circular water surface, so its required area is found with the circle-area formula: π multiplied by the radius squared. The radius is 13 feet, so squaring it gives 169 square feet. Multiplying 169 by π gives approximately 530.93 square feet. Because the question asks for the result to the nearest whole number, 530.93 rounds to 531.

Square feet are essential because area measures a two-dimensional surface, rather than a one-dimensional distance around the pool. The resulting value represents the amount of cover material needed to span the circular surface, assuming the cover is cut to match the pool's dimensions. This calculation uses the radius directly; the diameter is not needed. For guidance on the formula for the area of a circle and the meaning of radius, see Math Is Fun: Area of a Circle. For further information on rounding decimal values to the nearest whole number, see Khan Academy: Rounding Decimals.

QUESTION NO: 12

A construction company is building a new staircase. You previously determined that there are to be 14 risers and 13 treads. However, you forgot to write down what the width of each tread should be. Determine the width of each tread.



A. 6 ½ “

B. 7 1/8”

C. 7 7/8”

D. 8 ½ “

E. 9 7/8”

ANSWER: E

Explanation:

The correct tread width is **9 7/8”**. A stair with 14 risers has 13 horizontal treads, because the upper floor or landing serves as the final walking surface rather than requiring another tread. The diagram provides the staircase’s total horizontal run of 128 3/8 inches. To determine the equal width of each tread, divide that total run by the 13 treads: 128 3/8 ÷ 13 = 9 7/8 inches. This result can be checked by multiplying 9 7/8 inches by 13: 9 7/8 × 13 = 128 3/8 inches, which matches the required horizontal distance shown in the drawing. This is the type of practical measurement calculation assessed in WorkKeys Applied Math: identify the relevant dimensions, select the appropriate operation, and express the result in the needed unit. ACT describes Applied Math as solving workplace problems involving measurement, quantity, and mathematical reasoning. See ACT WorkKeys Applied Math and the ACT Applied Math Study Guide.

QUESTION NO: 13

A factory ratified a new contract. The new starting wage is $14.25. Next year on June 1 the wages will increase 4%. The year after next, the increase will be another 4%. The year after that the increase will be 2%. What will the starting wage be three years from now?

A. $14.82

B. $15.41

C. $15.72

D. $16.03

E. $18.04

ANSWER: C

Explanation:

$15.72 is correct because each scheduled raise is applied to the wage resulting from the preceding raise. This is successive percentage change, so the percentages must be compounded rather than added together and applied once to the original $14.25 wage. After the first 4% increase, multiply $14.25 by 1.04, producing $14.82. Apply the second 4% increase to that new amount: $14.82 × 1.04 = $15.4128. For the third-year 2% increase, multiply the current wage by 1.02: $15.4128 × 1.02 = $15.721056. Wages are expressed in dollars and cents, so round the final amount to the nearest cent, giving $15.72.

This approach reflects the Applied Math skill of identifying the needed mathematical operations from a workplace scenario and carrying out multistep calculations accurately. The multiplier form is particularly useful: a 4% increase corresponds to 1.04 and a 2% increase corresponds to 1.02, yielding $14.25 × 1.04 × 1.04 × 1.02. ACT describes Applied Math as using mathematical reasoning to solve work-related problems in its WorkKeys Applied Math assessment overview; additional preparation guidance is available in ACT's WorkKeys for Job Seekers resources.

QUESTION NO: 14

Envelopes cost $40.95 per 1000 if you buy at least 1000 envelopes—or $77.90 per 2000 if you buy at least 2000 envelopes. Which is the better buy and by how much?

A. 1000 envelopes by $0.002

B. 1000 envelopes by $0.038

C. 2000 envelopes by $0.045

D. 2000 envelopes by $0.002

E. They are equal in cost.

ANSWER: D

Explanation:

2000 envelopes by $0.002 is correct because the comparison must be made using the same unit rate: cost per individual envelope. For the 1,000-envelope quantity, divide $40.95 by 1,000, which gives $0.04095 per envelope. For the 2,000-envelope quantity, divide $77.90 by 2,000, which gives $0.03895 per envelope. The difference between the two unit prices is $0.04095 minus $0.03895, or $0.002 per envelope. Since $0.03895 is the lower unit price, purchasing 2,000 envelopes provides the better value, saving two-tenths of a cent for each envelope compared with the 1,000-envelope purchase. This type of problem is a unit-rate comparison: divide each total price by its corresponding number of items, then compare the resulting per-item costs. The calculation also shows that buying 2,000 envelopes costs $4.00 less than purchasing two separate groups of 1,000 at the higher rate, which is consistent with a savings of $0.002 across 2,000 envelopes. For further practice with ratios and rates, see OpenStax: Ratios and Rates and Khan Academy: Unit rates.

QUESTION NO: 15

Your parents have given you permission to repaint your bedroom. The dimensions of the room are 13½ feet by 14½ feet, and it is 8 feet high. The room has two windows with dimensions 3 feet by 4 feet, and the doorway measures 7 feet by 3 feet. According to the directions on the can, one gallon of paint will cover 300 square feet. You plan on putting on two coats of paint. Determine how many gallons of paint you will need to cover the walls and ceiling.

A. 4

B. 6

C. 8

D. 10

E. 16

ANSWER: A

Explanation:

4 is correct. First, find the total wall area by multiplying the room's perimeter by its height. The perimeter is 2 × (13.5 + 14.5), or 56 feet, so the walls have an area of 56 × 8 = 448 square feet. The windows occupy 2 × (3 × 4) = 24 square feet, and the doorway occupies 7 × 3 = 21 square feet. Subtracting these openings gives 448 − 24 − 21 = 403 square feet of paintable wall area.

The ceiling area is 13.5 × 14.5 = 195.75 square feet. Therefore, one coat requires coverage of 403 + 195.75 = 598.75 square feet. Since two coats are planned, the total coverage needed is 598.75 × 2 = 1,197.5 square feet. At 300 square feet per gallon, 1,197.5 ÷ 300 = 3.9917 gallons. Paint must be purchased in whole gallons, so this amount is rounded up to 4 gallons. This uses standard rectangle-area calculations and the practical rule of rounding material quantities up when a partial container cannot provide the needed coverage. See ACT WorkKeys Applied Math and Math Is Fun: Rectangle Area.