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Topic Break Down

Topic	No. of Questions
Topic 1, Number Sense and Operations	23
Topic 2, Algebra	11
Topic 3, Geometry	1
Topic 4, Measurement	7
Topic 5, Data Analysis, Statistics, and Probability	4
Total	46

QUESTION NO: 1

Reggie has enough flour to last for 40 days. If he increases his use of flour by 25%, however, how many days' worth of flour will he have?

A. 30 days

B. 28 days

C. 32 days

D. 48 days

E. 36 days

ANSWER: C

Explanation:

32 days is correct because the total quantity of flour does not change; only Reggie's daily rate of use changes. Let his original daily flour use be one unit. A 25% increase means that his new daily use is 1.25 units, which is equivalent to 5/4 of the original rate. Since the flour originally lasts 40 days at the original rate, the number of days it will last at the new rate is found by dividing 40 by 1.25: 40 ÷ 1.25 = 32. Equivalently, because the rate is multiplied by 5/4, the duration must be multiplied by the reciprocal, 4/5: 40 × 4/5 = 32. This is an inverse proportionality situation: when a fixed supply is consumed faster, it lasts for fewer days. Percentage increases should be applied to the consumption rate first, rather than subtracting 25% directly from the number of days. For background on converting percentages to decimal multipliers, see OpenStax Prealgebra: Decimals. The related rate-and-proportion reasoning is discussed in OpenStax Prealgebra: Ratios and Rates.

QUESTION NO: 2

If 5x + 7 = 8x – 2, then

A. x = 5

B. x = 3

C. x = 4

D. x = 2

E. x = 1

ANSWER: B

Explanation:

The correct result is **x = 3**. To solve the equation, preserve equality by performing the same operation on each side. Begin with 5x + 7 = 8x − 2. Subtracting 5x from both sides collects all variable terms on the right, giving 7 = 3x − 2. Next, add 2 to both sides to isolate the term containing x: 9 = 3x. Finally, divide both sides by 3, yielding x = 3. A quick substitution verifies the result: when x is 3, the left side is 5(3) + 7, or 22, and the right side is 8(3) − 2, also 22. Since both expressions have the same value, x = 3 satisfies the original equation. This uses the standard inverse-operation approach for solving linear equations: move variable terms together, isolate the variable term, and divide by its coefficient. For additional guidance on solving one-variable linear equations, see Khan Academy's linear-equations lessons and OpenStax's explanation of equality properties.

QUESTION NO: 3

3/8 + 1/3 + 1/8 =

A. 5/6

B. 3/4

C. 1/2

D. 3/5

E. 2/5

ANSWER: A

Explanation:

The correct sum is **5/6**. To add fractions, first express each fraction using a shared denominator. The denominators are 8 and 3, and their least common denominator is 24. Rewrite 3/8 as 9/24 because both its numerator and denominator are multiplied by 3. Rewrite 1/3 as 8/24 because both its numerator and denominator are multiplied by 8. Rewrite 1/8 as 3/24 because both its numerator and denominator are multiplied by 3. The expression therefore becomes 9/24 + 8/24 + 3/24. Adding the numerators gives 20/24. This fraction simplifies by dividing the numerator and denominator by 4, producing 5/6. As a quick check, 3/8 plus 1/8 is 4/8, or 1/2; adding 1/2 and 1/3 gives 3/6 + 2/6, which is also 5/6. This confirms that **5/6** is the correct result. For guidance on finding common denominators and adding fractions, see OpenStax Prealgebra: Add and Subtract Fractions and Khan Academy: Adding and Subtracting Fractions.

QUESTION NO: 4

Written in scientific notation, the number 173,000,000,000 is:

A. 17.3 x 1010

B. 173 x 109

C. 1.73 x 1011

D. 1.73 x 1010

E. 172 x 1012

ANSWER: C

Explanation:

The correct scientific-notation form is **1.73×10^{11}**. Scientific notation expresses a number as a coefficient greater than or equal to 1 and less than 10, multiplied by a power of 10. Starting with 173,000,000,000, place the decimal point after the first nonzero digit to obtain 1.73. To restore the original value, the decimal must move 11 places to the right: 1.73 becomes 17.3 after one place, 173 after two places, and continuing through the zeros reaches 173,000,000,000 after 11 places. Therefore, the required multiplier is 10^{11}, because each power of 10 shifts the decimal point one place to the right. This also can be verified numerically: 10^{11} equals 100,000,000,000, and 1.73 multiplied by 100,000,000,000 equals 173,000,000,000. Standard scientific notation requires the leading coefficient to remain in the interval from 1 up to, but not including, 10. For guidance on powers of ten and scientific notation, see Khan Academy's scientific notation lesson and Encyclopaedia Britannica's overview of scientific notation.