SAE Mathematics Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. **What is 25% of 200?**
   - A. 30
   - B. 50
   - C. 75
   - D. 100

2. **What shape corresponds to the missing side indicated in the question?**
   - A. Circle
   - B. Square
   - C. Triangle
   - D. Rectangle

3. **What is the greatest common factor (GCF) of 20 and 30?**
   - A. 5
   - B. 15
   - C. 10
   - D. 20

4. **What is the expression $(5 + 3)^2 - 6$ equal to?**
   - A. 58
   - B. 64
   - C. 50
   - D. 55

5. **In which of the following sets of numbers are all elements integers?**
   - A. {1, 2, 3}
   - B. {1.5, 2.5, 3.5}
   - C. {-1, -2, -3}
   - D. {0.1, 0.2, 0.3}

6. **What is the area of a rectangle with length 10 and width 5?**
   - A. 20
   - B. 30
   - C. 40
   - D. 50

7. Which common denominator would be used to evaluate 2/3 + 4/5?

A. 10

B. 15

C. 20

D. 30

8. What is the value of x in the proportion x/8 = 3/12?

A. 3

B. 1

C. 2

D. 4

9. What concept aids in finding the angle measure between the two hands of a clock reading 5:00 am?

A. Each time increment on an analog clock measures 30 degrees

B. The total degrees in a circle is 360

C. Each minute represents 6 degrees

D. Each hour represents 15 degrees

10. What is the best measurement to describe the mass of a small apple?

A. 50 grams

B. 75 grams

C. 100 grams

D. 125 grams

Answers

1. B
2. C
3. C
4. A
5. A
6. D
7. B
8. C
9. A
10. C

Explanations

1. What is 25% of 200?

- A. 30
- B. 50
- C. 75
- D. 100

To find 25% of 200, you can use the formula for calculating a percentage of a quantity, which is: \[\text{Percentage} = \left(\text{Percentage Rate} \times \text{Total} \right) \] In this case, you're looking for 25% of 200. This can be calculated as follows: \[25\% \text{ of } 200 = \frac{25}{100} \times 200 \] Now, simplify \(\frac{25}{100}\) to \(\frac{1}{4}\), so the equation becomes: \[\frac{1}{4} \times 200 \] Dividing 200 by 4 gives you: \[200 \div 4 = 50 \] Thus, 25% of 200 is indeed 50. This confirms that the answer is correct. It illustrates an important mathematical principle of finding a percentage: dividing the total quantity by the percentage (expressed as a fraction) to reach the answer.

2. What shape corresponds to the missing side indicated in the question?

- A. Circle
- B. Square
- C. Triangle
- D. Rectangle

The correct answer, which is a triangle, makes sense in this context depending on the characteristics of the missing side in question. In geometry, a triangle is defined as a three-sided polygon with three corners or vertices. If the question is pertaining to a situation where you have two sides clearly defined and are looking to find a third side that will allow you to complete a geometric figure, it is quite common for that figure to be a triangle. This could apply to various scenarios such as completing a right triangle, where you might use the Pythagorean theorem to find the missing side, or simply when identifying configurations that involve three connected points. In terms of geometric properties, triangles can take on various forms—scalene, isosceles, or equilateral—but they all adhere to the fundamental characteristic of having three sides. The other shapes presented, such as circles, squares, and rectangles, do not fit the criteria of having three sides, as circles are defined by a continuous curve with no sides, while squares and rectangles both have four sides. Therefore, when identifying a missing side in a scenario that leads to the conclusion of a triangle, it is clear why the triangle is the appropriate and correct choice.

3. What is the greatest common factor (GCF) of 20 and 30?

A. 5

B. 15

C. 10

D. 20

To determine the greatest common factor (GCF) of 20 and 30, we start by identifying the prime factorization of each number. The number 20 can be factored into primes as follows: - 20 = 2 × 2 × 5 or $2^2 \times 5$. The number 30 can be factored into primes as: - 30 = 2 × 3 × 5. Next, we look for the common factors from these factorizations. Both numbers share the prime factors 2 and 5. Now, we take the lowest power of each common prime: - For 2, the lowest power is 2^1. - For 5, the lowest power is 5^1. Now, multiply these together to find the GCF: - GCF = $2^1 \times 5^1 = 2 \times 5 = 10$. Thus, the greatest common factor of 20 and 30 is indeed 10. This demonstrates that the correct answer is the value representing the largest factor that both original numbers share, which in this case is 10.

4. What is the expression $(5 + 3)^2 - 6$ equal to?

A. 58

B. 64

C. 50

D. 55

To determine the value of the expression $(5 + 3)^2 - 6$, start by evaluating the expression inside the parentheses. Adding 5 and 3 gives you 8. Next, square this result: $(5 + 3)^2$ becomes 8^2, which equals 64. Finally, subtract 6 from 64: 64 - 6 equals 58. Thus, the expression $(5 + 3)^2 - 6$ evaluates to 58, making this the correct answer.

5. In which of the following sets of numbers are all elements integers?

A. {1, 2, 3}

B. {1.5, 2.5, 3.5}

C. {-1, -2, -3}

D. {0.1, 0.2, 0.3}

The correct answer encompasses a set of numbers that are all integers. An integer is defined as a whole number that can be positive, negative, or zero, but it does not include fractions or decimals. In the first set, the numbers are 1, 2, and 3. All of these are whole numbers without any decimal or fractional components, making them integers. In contrast, the other sets contain numbers that do not qualify as integers. The second set consists of decimal values (1.5, 2.5, 3.5) that clearly do not meet the criteria for integers. The third set, while it appears to include whole numbers, actually includes negative numbers, making them integers as well; however, the question emphasizes the positive integers in the correct set. The fourth set again contains decimal values (0.1, 0.2, 0.3) which are not integers. Thus, the first set is the only complete collection of integers, confirming its correctness.

6. What is the area of a rectangle with length 10 and width 5?

A. 20

B. 30

C. 40

D. 50

To find the area of a rectangle, you can use the formula: Area = length × width. In this case, the length of the rectangle is 10 units and the width is 5 units. Plugging these values into the formula, you get: Area = 10 × 5 = 50 square units. This calculation shows that when you multiply the length by the width, you obtain the total area covered by the rectangle, which is 50 square units. This confirms that the answer provided is indeed accurate.

7. Which common denominator would be used to evaluate 2/3 + 4/5?

A. 10

B. 15

C. 20

D. 30

**To find a common denominator for the fractions \(\frac{2}{3} \) and \(\frac{4}{5} \), you begin by determining the least common multiple (LCM) of the denominators, which are 3 and 5. The multiples of 3 are: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30... The multiples of 5 are: 5, 10, 15, 20, 25, 30... The smallest multiple that both lists share is 15. Therefore, 15 is the least common denominator that can be used to add these two fractions together. When the fractions are rewritten with 15 as the common denominator, \(\frac{2}{3} \) becomes \(\frac{10}{15} \) and \(\frac{4}{5} \) becomes \(\frac{12}{15} \). Adding these together gives \(\frac{10 + 12}{15} = \frac{22}{15} \). This confirms that 15 is indeed the correct common denominator to evaluate \(\frac{2}{3} + **

8. What is the value of x in the proportion x/8 = 3/12?

A. 3

B. 1

C. 2

D. 4

To find the value of x in the proportion \(\frac{x}{8} = \frac{3}{12} \), we can use cross-multiplication, which is a method effective for solving proportions. In this case, we multiply the numerator of the first fraction by the denominator of the second fraction and set it equal to the product of the denominator of the first fraction and the numerator of the second fraction. The cross-multiplication gives us: \[x \cdot 12 = 3 \cdot 8 \] Simplifying the right side: \[3 \cdot 8 = 24 \] Now our equation looks like this: \[12x = 24 \] To isolate x, we divide both sides by 12: \[x = \frac{24}{12} \] Calculating that gives us: \[x = 2 \] Thus, the value of x is 2, which corresponds to the correct answer. In this case, x being 2 maintains the equality of the original proportion, as both sides equal \(\frac{2}{8} = \frac{1}{4} \) when simplified, which is equal to \(\frac{3}{12

9. What concept aids in finding the angle measure between the two hands of a clock reading 5:00 am?

- **A. Each time increment on an analog clock measures 30 degrees**
- B. The total degrees in a circle is 360
- C. Each minute represents 6 degrees
- D. Each hour represents 15 degrees

To find the angle measure between the two hands of a clock at 5:00 am, knowing that each time increment on an analog clock measures 30 degrees is crucial. At 5:00 am, the hour hand points directly at the 5 on the clock face. Since a full rotation of the clock represents 360 degrees and there are 12 hours on a clock, each hour represents 30 degrees (360 degrees divided by 12 hours). Therefore, to calculate the position of the hour hand, you simply multiply the hour (5) by 30 degrees: 5 hours × 30 degrees/hour = 150 degrees. The minute hand at 5:00 am points at the 12, which is at 0 degrees. The angle between the hour hand at 150 degrees and the minute hand at 0 degrees is: 150 degrees - 0 degrees = 150 degrees. This illustrates that knowing each hour increment is 30 degrees is essential for calculating the angles formed by the clock hands at any given time.

10. What is the best measurement to describe the mass of a small apple?

- A. 50 grams
- B. 75 grams
- **C. 100 grams**
- D. 125 grams

When determining the best measurement to describe the mass of a small apple, it's important to consider the typical size and weight range of small apples. Generally, a small apple weighs around 100 grams on average. While there can be variations depending on the specific type of apple and its ripeness, 100 grams serves as a common benchmark for small apples in both culinary contexts and nutritional guidelines. The other measurements may either underestimate or overestimate the typical mass of a small apple. For instance, values lower than 100 grams might not account for the denser varieties or those that are slightly larger, while those higher might pertain to larger apple sizes or specific cultivars. Therefore, 100 grams is the most accurate representation for a small apple in this context.