TExES Mathematics 4-8 (115) Practice Test (Sample)

Study Guide

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Questions

1. **What does the acronym SSS stand for in relation to triangle congruence?**

   A. Side, Side, Angle

   B. Side, Angle, Side

   C. Side, Side, Side

   D. Angle, Angle, Side

2. **In the slope-intercept form of a linear equation, what does 'm' represent?**

   A. The y-intercept of the graph.

   B. The x-intercept of the graph.

   C. The slope of the line.

   D. The y-coordinate at the origin.

3. **What characteristic describes an obtuse angle?**

   A. Less than 90 degrees

   B. Measures exactly 180 degrees

   C. More than 90 but less than 180 degrees

   D. More than 180 degrees

4. **What does the average rate of change represent in a function?**

   A. Change over a single point

   B. Change over a specific interval

   C. Instantaneous change

   D. Constant change

5. **What is the result of applying the identity property of addition to the number 5?**

   A. 5

   B. 0

   C. 1

   D. 10

6. **Which of the following statements about combinations is true?**

    A. The order of selection is important

    B. They can only be used for groups of 3

    C. They are used for selecting without regard to order

    D. Only applicable for identical objects

7. **What formula is used to calculate the slope of a line between two points?**

    A. (y2 - y1) / (x2 - x1)

    B. (x2 - x1) / (y2 - y1)

    C. (y1 + y2) / (x1 + x2)

    D. (x1 + x2) / (y1 + y2)

8. **What is the product of 9 and 5?**

    A. 35

    B. 45

    C. 55

    D. 65

9. **Which of the following fractions is equivalent to 0.25?**

    A. 1/2

    B. 1/4

    C. 3/4

    D. 2/5

10. **Which characteristic defines composite numbers?**

    A. Whole numbers that have exactly two factors

    B. Whole numbers greater than one

    C. Whole numbers that have more than two different factors

    D. Numbers that cannot be divided evenly by one

Answers

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

Explanations

1. What does the acronym SSS stand for in relation to triangle congruence?

A. Side, Side, Angle

B. Side, Angle, Side

C. Side, Side, Side

D. Angle, Angle, Side

The acronym SSS stands for "Side, Side, Side" in relation to triangle congruence. This means that if all three sides of one triangle are congruent (equal in length) to the corresponding three sides of another triangle, then those two triangles are congruent. This is a fundamental criterion in triangle geometry, allowing us to establish that two triangles are identical in shape and size simply by comparing the lengths of their sides. Congruence in this context indicates that the triangles not only have the same dimensions but also occupy the same space in a plane. This property is crucial in various geometric proofs and applications, illustrating the predictable nature of geometric figures. Understanding SSS helps students apply congruence principles effectively in solving problems related to triangles.

2. In the slope-intercept form of a linear equation, what does 'm' represent?

A. The y-intercept of the graph.

B. The x-intercept of the graph.

C. The slope of the line.

D. The y-coordinate at the origin.

In the slope-intercept form of a linear equation, which is expressed as $y = mx + b$, the symbol 'm' specifically represents the slope of the line. The slope indicates how steep the line is and the direction in which it moves. More concretely, the slope is defined as the ratio of the change in the y-coordinate to the change in the x-coordinate between any two points on the line. This means that if you move one unit horizontally (along the x-axis), the slope tells you how many units you will move vertically (along the y-axis). A positive slope indicates that the line rises as it moves from left to right, while a negative slope indicates that the line falls. Identifying 'm' correctly is crucial in graphing linear equations and understanding the relationship between the variables represented in the equation. This knowledge aids in predicting the behavior of the line as well as in solving real-world problems related to linear relationships.

3. What characteristic describes an obtuse angle?

A. Less than 90 degrees

B. Measures exactly 180 degrees

C. More than 90 but less than 180 degrees

D. More than 180 degrees

An obtuse angle is defined as an angle that measures more than 90 degrees but less than 180 degrees. This means that it is larger than a right angle (which is exactly 90 degrees) and smaller than a straight angle (which is exactly 180 degrees). The correct answer highlights this specific range, distinguishing obtuse angles from acute angles (which are less than 90 degrees) and straight angles (which are exactly 180 degrees). Understanding these definitions is key to identifying and classifying angles accurately in various mathematical contexts.

4. What does the average rate of change represent in a function?

A. Change over a single point

B. Change over a specific interval

C. Instantaneous change

D. Constant change

The average rate of change in a function represents how much the function's output (or dependent variable) changes, on average, for a given change in the input (or independent variable) over a specific interval. Formally, it is calculated by taking the difference in the function's values at two points and dividing it by the difference in the input values at those points. This concept is essential for understanding how a function behaves between two specific values rather than at just one point. When assessing the average rate of change, it provides a more holistic view of the function's behavior over that interval, as opposed to just looking at a single point or instantaneous change. It does not pertain to instantaneous rates of change, which would require calculus to analyze, nor does it imply constancy throughout the function's domain. Thus, this understanding is crucial in various mathematical applications, including interpreting the slope of secant lines on a graph of the function.

5. What is the result of applying the identity property of addition to the number 5?

A. 5

B. 0

C. 1

D. 10

The identity property of addition states that when you add zero to any number, the result is that same number. In this case, when applying the identity property to the number 5, it means that adding 0 to 5 will not change its value. Thus, 5 + 0 equals 5. Therefore, the correct result is that the number remains unchanged, which is 5. This property is fundamental in arithmetic and serves as a foundational concept in understanding how addition operates with respect to different entities in mathematics.

6. Which of the following statements about combinations is true?

    A. The order of selection is important

    B. They can only be used for groups of 3

    C. They are used for selecting without regard to order

    D. Only applicable for identical objects

When considering combinations, the fundamental principle is that they are used to select items without regard to the order in which those items are selected. This is crucial because it distinguishes combinations from permutations, where the order does matter. For instance, if you have a set of objects and you want to choose a few, the different ways to select these items without considering the sequence in which they are chosen characterizes a combination. For example, choosing the objects A, B, and C is the same combination as choosing C, B, and A; both represent the same selection. The other statements about combinations misrepresent their characteristics. The first option incorrectly suggests that order matters, which is contrary to the definition of combinations. The second option erroneously restricts combinations to groups of three, while they can actually be formed from any number of items. Lastly, stating that combinations are only for identical objects ignores the reality that combinations can involve distinct elements.

7. What formula is used to calculate the slope of a line between two points?

    A. (y2 - y1) / (x2 - x1)

    B. (x2 - x1) / (y2 - y1)

    C. (y1 + y2) / (x1 + x2)

    D. (x1 + x2) / (y1 + y2)

The formula used to calculate the slope of a line between two points is derived from the definition of slope in a Cartesian coordinate system. Slope represents the rate of change of the dependent variable (y) with respect to the independent variable (x). When you have two points, denoted as (x1, y1) and (x2, y2), the slope is calculated by determining the change in the y-coordinates divided by the change in the x-coordinates. The specific formula, (y2 - y1) / (x2 - x1), effectively captures this concept. Here, (y2 - y1) indicates the vertical change (rise), and (x2 - x1) indicates the horizontal change (run). This ratio tells you how much y changes for a given change in x, which is the definition of slope. Thus, the correct answer accurately reflects the relationship between the two points and is fundamental in graphing linear equations and understanding their characteristics.

8. What is the product of 9 and 5?

A. 35

B. 45

C. 55

D. 65

To find the product of 9 and 5, you perform multiplication. The operation is calculated as follows: 9 multiplied by 5 means you are adding the number 9 to itself 5 times. This can be expressed as: 9 + 9 + 9 + 9 + 9 Alternatively, you can simply calculate it directly: 9 × 5 = 45 Thus, the correct answer, which represents the product of 9 and 5, is indeed 45. This shows a fundamental understanding of multiplication as an addition of equal groups.

9. Which of the following fractions is equivalent to 0.25?

A. 1/2

B. 1/4

C. 3/4

D. 2/5

To determine which fraction is equivalent to 0.25, it's essential to understand the relationship between decimals and fractions. The decimal 0.25 can be expressed as a fraction by interpreting it as 25 out of 100, written mathematically as 25/100. This fraction can be simplified by dividing both the numerator and denominator by their greatest common divisor, which is 25. When we simplify 25/100, we divide the numerator (25) by 25, resulting in 1, and we divide the denominator (100) by 25, yielding 4. This gives us 1/4. Thus, the fraction that is equivalent to 0.25 is 1/4, as it represents the same value in fractional form. When converted back into decimal form, 1/4 equals 0.25, confirming their equivalence. Other fractions like 1/2, 3/4, and 2/5 represent values that do not match the decimal value of 0.25. For instance, 1/2 equals 0.5, 3/4 equals 0.75, and 2/5 is 0.4. These values differ significantly from

10. Which characteristic defines composite numbers?

A. Whole numbers that have exactly two factors

B. Whole numbers greater than one

C. Whole numbers that have more than two different factors

D. Numbers that cannot be divided evenly by one

Composite numbers are defined as whole numbers that have more than two distinct factors. This means that a composite number can be divided evenly by numbers other than just one and itself. For instance, the number 6 is a composite number because it can be divided evenly not only by 1 and 6, but also by 2 and 3. In contrast, the characteristic stating that a number has exactly two factors describes prime numbers, which cannot be composite. The condition of being a whole number greater than one is true for all composite numbers, but it is also true for prime numbers, which limits its usefulness in distinguishing composite numbers specifically. The statement about numbers that cannot be divided evenly by one does not accurately reflect composite numbers, as all whole numbers, including composite numbers, can be divided by one evenly. Therefore, the identifying feature of composite numbers is that they possess three or more factors, confirming choice C as the correct definition.