

MTTC Lower Elementary (PK-3) Education - Mathematics (119) Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

SAMPLE

- 1. Which is the largest two-digit number?**
 - A. 90**
 - B. 99**
 - C. 98**
 - D. 100**
- 2. What is the value of $10 \div 2$?**
 - A. 2**
 - B. 5**
 - C. 10**
 - D. 20**
- 3. How many sides does a hexagon have?**
 - A. 5**
 - B. 6**
 - C. 7**
 - D. 8**
- 4. What does the representation with tiles help students develop an understanding of?**
 - A. Critique the reasoning of others.**
 - B. Support reasoning with evidence.**
 - C. Create a basis for the concept of grouping.**
 - D. Develop understanding of the base-ten system.**
- 5. What conclusion can be drawn about the overview of mathematical strategies used by students in solving basic addition and subtraction problems?**
 - A. Students show a preference for traditional algorithms regardless of context**
 - B. Students are likely to develop their own strategies beyond the traditional methods**
 - C. Students continue to struggle with abstract concepts due to reliance on procedures**
 - D. Students demonstrate an exceptional understanding of new mathematical frameworks**

- 6. How does Student A's explanation compare to Student B's when discussing fractions with the same numerator?**
- A. Student A explains a fraction is greater if the numerator is closer to the denominator.**
 - B. Student A compares fractions using common number of attempts.**
 - C. Student A uses equivalent fractions to compare magnitudes.**
 - D. Student A focuses only on the numerator in their comparison.**
- 7. What is the most accurate description of a student's work on comparing strings of different lengths?**
- A. The student's drawing incorporates "taking away" to appropriately model subtraction**
 - B. The student's drawing appropriately models subtraction by finding the difference between the two numbers**
 - C. The student used an incorrect method for solving the problem**
 - D. The student has shown counting up strategies but has made an error**
- 8. What learning target should be addressed when students create two-digit numbers from drawn cards and compare them?**
- A. Identify reasonable numbers as solutions.**
 - B. Compare two numbers using place values.**
 - C. Use mathematical tools to explain their thinking.**
 - D. Construct numbers to solve mathematical problems.**
- 9. What is the formula for finding the area of a triangle?**
- A. Area = base x height**
 - B. Area = 2 x base x height**
 - C. Area = $\frac{1}{2}$ x base x height**
 - D. Area = base + height**

10. If a line segment is divided into 4 equal parts, what is each part called?

- A. A quarter**
- B. A half**
- C. A third**
- D. An eighth**

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Answers

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

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Explanations

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1. Which is the largest two-digit number?

- A. 90
- B. 99**
- C. 98
- D. 100

The largest two-digit number is 99 because it is the highest quantity that can be represented with two digits in the decimal system. Two digits consist of a tens place and a units place, and for the tens place, the maximum digit is 9. Therefore, when the tens place is occupied by 9 and the units place can also be occupied by up to 9, the combination of both gives us 99. In contrast, 100, although a number greater than 99, is not a two-digit number; it is instead the smallest three-digit number. Thus, it doesn't qualify within the range we are considering for two-digit numbers. The other two-digit numbers, 90 and 98, are less than 99, making them smaller options. Therefore, 99 stands out as the maximum possible value within the two-digit format.

2. What is the value of $10 \div 2$?

- A. 2
- B. 5**
- C. 10
- D. 20

When dividing 10 by 2, you are essentially determining how many times 2 can be subtracted from 10 until you reach zero. By performing the division, you find that 2 can be taken out of 10 a total of 5 times (since $2 + 2 + 2 + 2 + 2 = 10$). This means that 10 divided by 2 equals 5, which is the principle behind division as an operation that breaks a number into equal parts or groups. Thus, the computation demonstrates that $10 \div 2$ results in 5, confirming the answer. Understanding this fundamental concept of division is essential in mathematics, especially in early education, as it lays the groundwork for more complex arithmetic operations.

3. How many sides does a hexagon have?

- A. 5
- B. 6**
- C. 7
- D. 8

A hexagon is defined as a polygon with six sides. This characteristic is derived from its name; the prefix "hex-" is derived from Greek, meaning "six." In geometry, polygons are classified based on the number of their sides. A hexagon directly follows a pentagon (which has five sides) and is succeeded by a heptagon (which has seven sides), illustrating a clear numerical progression. Therefore, identifying that a hexagon has six sides is foundational in understanding basic geometric shapes. This knowledge is important not only for mathematics but also for recognizing patterns and shapes in the world around us.

4. What does the representation with tiles help students develop an understanding of?

- A. Critique the reasoning of others.**
- B. Support reasoning with evidence.**
- C. Create a basis for the concept of grouping.**
- D. Develop understanding of the base-ten system.**

The representation with tiles is a concrete way to illustrate mathematical concepts, especially in building an understanding of the base-ten system. When students use tiles, they can physically manipulate objects to represent units (ones), tens, hundreds, and so on. This hands-on approach helps students visualize how numbers are constructed and decomposed within the base-ten system. For example, a group of ten unit tiles can be bundled to represent one ten tile. This not only reinforces the concept of counting in tens but also helps students grasp place value—the foundation of our number system. By working with tiles, students can see how numbers work together within the structure of the base-ten system, facilitating a deeper comprehension of addition, subtraction, and even multiplication as they learn to regroup and reorganize quantities. This foundational understanding is crucial for their future work in mathematics, as it sets the stage for more advanced concepts and operations.

5. What conclusion can be drawn about the overview of mathematical strategies used by students in solving basic addition and subtraction problems?

- A. Students show a preference for traditional algorithms regardless of context**
- B. Students are likely to develop their own strategies beyond the traditional methods**
- C. Students continue to struggle with abstract concepts due to reliance on procedures**
- D. Students demonstrate an exceptional understanding of new mathematical frameworks**

The conclusion that students are likely to develop their own strategies beyond traditional methods highlights the importance of fostering creativity and critical thinking in mathematics education. When students create their own approaches to solving basic addition and subtraction problems, they engage more deeply with the concepts being taught. This self-directed learning allows for a better understanding of number sense, as students can explore various methods such as visualization, drawing, or using manipulatives to conceptualize mathematical problems. Encouraging students to devise their own strategies can also enhance their confidence and promote a growth mindset, as they learn that there are multiple pathways to arrive at an answer. This adaptability is crucial in mathematics, where problem-solving often requires flexibility in thinking. Moreover, as they experiment with different techniques, students may discover more efficient or intuitive methods tailored to their understanding, contributing to a richer mathematical experience.

6. How does Student A's explanation compare to Student B's when discussing fractions with the same numerator?

- A. Student A explains a fraction is greater if the numerator is closer to the denominator.**
- B. Student A compares fractions using common number of attempts.**
- C. Student A uses equivalent fractions to compare magnitudes.**
- D. Student A focuses only on the numerator in their comparison.**

When discussing fractions that have the same numerator, focusing only on the numerator provides a limited perspective on how to compare their values accurately. In this case, the correct answer indicates that Student A is concentrating solely on the numerator without considering the denominator. Understanding fractions requires recognizing that the denominator represents the size of the whole that the numerator is a part of. For instance, in the fractions $\frac{3}{4}$ and $\frac{3}{8}$, both have the same numerator (3), but their value is determined by the different denominators. The fraction with the smaller denominator (in this case, $\frac{3}{4}$) is actually greater because each part is a larger piece of the whole compared to the same numerator with a larger denominator ($\frac{3}{8}$). In the context of the options provided, while other students may employ comparison methods involving attempts, equivalent fractions, or the position of the numerator relative to the denominator, only Student A's approach is purely focused on the numerator. This highlights a fundamental aspect of understanding fractions—the critical role that the denominator plays in determining the overall value of the fraction. Thus, focusing solely on the numerator can lead to misconceptions

7. What is the most accurate description of a student's work on comparing strings of different lengths?

- A. The student's drawing incorporates "taking away" to appropriately model subtraction**
- B. The student's drawing appropriately models subtraction by finding the difference between the two numbers**
- C. The student used an incorrect method for solving the problem**
- D. The student has shown counting up strategies but has made an error**

A student's work involving comparing strings of different lengths often focuses on finding the difference in lengths, which is a fundamental concept in understanding subtraction. The most accurate description highlights that the student has modeled subtraction correctly by determining the numerical difference between the two lengths. This process typically involves counting the units represented by each string and identifying how much longer or shorter one string is compared to the other. This description acknowledges that the student has successfully engaged with the mathematical concept of subtraction, using it to analyze and solve the problem related to string lengths. It aligns with the expectation that students can visualize comparisons through modeling and numeric calculation.

8. What learning target should be addressed when students create two-digit numbers from drawn cards and compare them?

A. Identify reasonable numbers as solutions.

B. Compare two numbers using place values.

C. Use mathematical tools to explain their thinking.

D. Construct numbers to solve mathematical problems.

The focus of the question is on how students engage with two-digit numbers created from drawn cards and the process of comparing those numbers. When students are comparing two-digit numbers, they are directly utilizing their understanding of place value, which is fundamental in mathematics. By addressing the comparison of two-digit numbers, students must recognize the value of each digit—understanding that the first digit represents the tens place while the second digit represents the ones place. This understanding allows students to determine which number is greater, less than, or equal to another by analyzing the digits based on their place values. In a classroom setting, discussing the comparison of these numbers promotes mathematical reasoning and helps solidify the concept of place value, which is crucial for their future understanding of arithmetic operations and number sense. Thus, the correct choice emphasizes the importance of place value in number comparison, reinforcing essential skills in early mathematics learning.

9. What is the formula for finding the area of a triangle?

A. Area = base x height

B. Area = 2 x base x height

C. Area = $\frac{1}{2}$ x base x height

D. Area = base + height

The formula for finding the area of a triangle is derived from the concept of multiplying the base of the triangle by its height and then taking half of that product. This is because a triangle can be thought of as half of a rectangle. The formula is expressed as $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$. In this formula, 'base' refers to the length of the triangle's base, and 'height' is the perpendicular distance from the base to the opposite vertex. The factor of one-half is crucial, as it accounts for the fact that a triangle occupies exactly half the area of a rectangle that has the same base and height. Understanding this relationship helps to solidify why the selected formula accurately represents the area of a triangle in geometric terms.

10. If a line segment is divided into 4 equal parts, what is each part called?

A. A quarter

B. A half

C. A third

D. An eighth

When a line segment is divided into 4 equal parts, each part represents one-fourth of the entire segment. This fraction can also be referred to in terms of a percentage, where each of those parts constitutes 25% of the whole. The term "quarter" is specifically used to denote one part out of four equal divisions, which directly aligns with the mathematical concept of fractions. Using the other terms: "half" refers to one part out of two equal divisions, "third" specifies one out of three equal divisions, and "eighth" indicates one out of eight equal divisions. Since none of these terms corresponds to dividing a segment into four parts, the correct term for each part in this case is indeed a quarter.