

**M-STEP**  
**Mathematics**  
**Practice Test Two**

1. What unknown number makes this equation true?

$$48 = 6 \times \square$$

- (A) 48
- (B) 6
- (C) 42
- (D) 8

2. Complete the chart below by rounding each number to the nearest 10 and hundred.

Number	Round to the Nearest 10	Round to the Nearest 100
324		
86		
950		
148		

3. Amy has 72 dominoes. She places them in rows of 9. How many rows of dominoes does Amy have?

- (A) 8
- (B) 63
- (C) 9
- (D) 72

4. The area of the entire rectangle below is 200 square feet.



Shade the rectangle to show an area of 75 square feet.

5. The Martinez Family is going on a road trip of 3,125 miles. They drove 1,000 miles on the first day and 880 miles on the second day. How many miles left does the family have to drive?

- (A) 1,880 miles
- (B) 4,125 miles
- (C) 1,245 miles
- (D) 4,005 miles

6. Fill in the correct symbol,  $<$ ,  $>$ ,  $=$ , to make each number sentence correct.

$$\frac{1}{3} \square \frac{3}{3}$$

$$\frac{2}{2} \square \frac{3}{3}$$

$$\frac{1}{2} \square \frac{6}{12}$$

7. What unknown number makes this equation true?

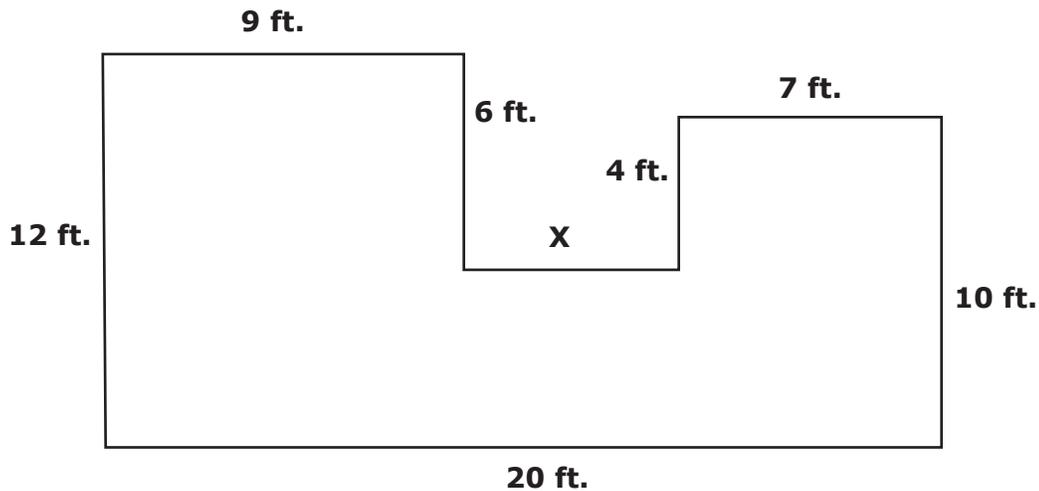
$$582 = 861 - \square$$

Answer: \_\_\_\_\_

8. Mark made 6 goody bags for his birthday party guests. Each goody bag had 6 treats. Which expressions can be used to find how many treats there were in the goody bags altogether?

- $6 \times 6$
- $6 + 6$
- $6 \div 6$
- $(6 + 6) + (6 + 6) + (6 + 6)$
- $6 \times 6 \times 6 \times 6 \times 6 \times 6$
- $12 + 12 + 12$

9. Use the figure below to answer the questions in Part A, Part B, and Part C.



**Part A**

Draw lines to show how the figure could be decomposed to help find the total area.

**Part B**

What is the value of X?

Answer: \_\_\_\_\_

**Part C**

What is the perimeter of the figure?

Answer: \_\_\_\_\_

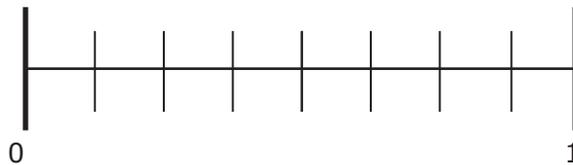
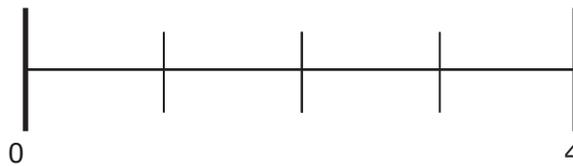
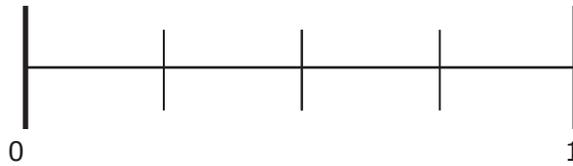
10. Complete each equation below.

$$5 \times 9 = (5 \times 5) + (5 \times \square)$$

$$4 \times 2 \times 3 = 8 \times \square$$

11. Look at how each of the number lines below is partitioned. Place each fraction on the appropriate number line. Some fractions will fit on more than one number line.

$$\frac{1}{4} \quad \frac{4}{8} \quad \frac{8}{8} \quad \frac{2}{4} \quad \frac{2}{8} \quad \frac{4}{2}$$



12. Trevor says that you can use the product of  $8 \times 6$  to help you find the product of  $80 \times 6$ . Is Trevor correct? Explain your thinking using pictures, numbers, and words.

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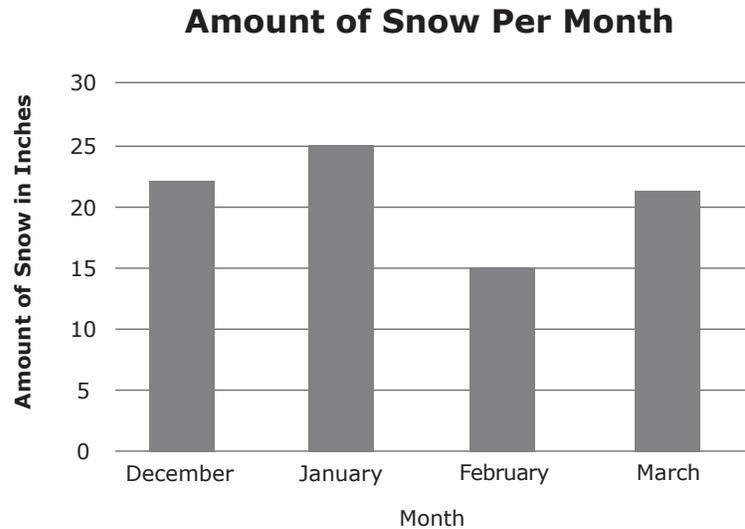
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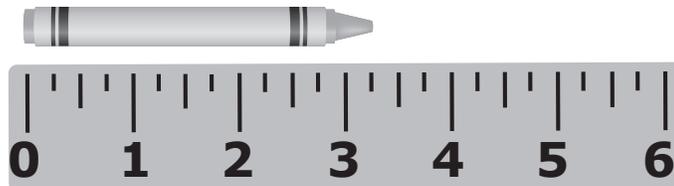
13. Mr. Rodriguez kept track of how much snow fell during the winter months. The bar graph below shows how much snow fell during each month, rounded to the nearest inch.



How much snow did Mr. Rodriguez measure throughout the entire winter?

Answer: \_\_\_\_\_ inches

14. Which of the following expressions can help you solve  $42 \div 6 = N$ , and why?
- (A)  $6 \div 42$ , because you can switch the order of the numbers and the answer will be the same
  - (B)  $42 \times 6$ , because multiplication and division are inverse operations
  - (C)  $N \div 6$ , because you can switch the order of the numbers and the answer will be the same
  - (D)  $N \times 6$ , because multiplication and division are inverse operations
15. What is the length of the crayon to the nearest quarter inch?



- (A)  $3 \frac{1}{4}$  inches
- (B) 3 inches
- (C)  $3 \frac{1}{2}$  inches
- (D)  $2 \frac{3}{4}$  inches

Each unit represents 1 inch

16. Maria has 8 dollars in her wallet. One-half of all of the dollars are in her wallet. Which equation shows how many dollars Maria has in her wallet?
- (A)  $\frac{1}{2} = 8$
  - (B)  $\frac{8}{4} = \frac{1}{2}$
  - (C)  $\frac{8}{1} = \frac{1}{2}$
  - (D)  $\frac{1}{2} = \frac{8}{16}$

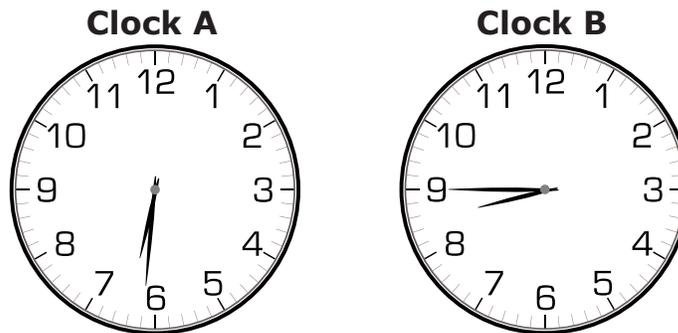
17. Destiny has some blue pens. She has 12 black pens and 9 red pens. If she has 30 pens altogether, how many blue pens does she have?

$$n = \underline{\hspace{2cm}}$$

18. A number has a 9 in its ones place. The number must be:

- (A) even
- (B) a multiple of 9
- (C) a multiple of 3
- (D) none of the above

19. How much time has passed from Clock A to Clock B?



- (A) 2 hours and 15 minutes
- (B) 2 hours and 14 minutes
- (C) 3 hours and 14 minutes
- (D) 1 hour and 45 minutes

Which of these statements is true? Choose ALL answers that apply.

- A parallelogram and a trapezoid have the same number of sides.
- All parallelograms are quadrilaterals.
- All rectangles are squares.
- All quadrilaterals are squares.
- All rectangles are parallelograms.

21. What unknown number makes this equation true?

$$\square = 400 - 259$$

Answer: \_\_\_\_\_

22. What unknown number makes both equations true?

$$\begin{aligned} 48 \div n &= 12 \\ n \times 6 &= 24 \end{aligned}$$

- (A) 2
- (B) 4
- (C) 6
- (D) 8

23. The Third Grade Class created a pictograph to show how many items were sold at the school store last week. The pictograph below shows how many of each kind of item were sold.

Item	Number Sold
Pencils	 
Erasers	
Pencil Sharpeners	 
Smelly Markers	    
Stickers	  

Each  = ?

How much is each  worth if the Third Grade Class sold 115 items altogether?

Answer: \_\_\_\_\_

24. Julian says that the fraction  $\frac{8}{8}$  is larger than the fraction  $\frac{4}{4}$  because there are more parts to the whole. Do you agree with Julian? Why or why not? Explain your thinking using pictures and words.

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25. Match each expression to the correct number.

- |                                      |            |
|--------------------------------------|------------|
| <b>12 tens + 11 ones</b>             | <b>210</b> |
| <b>1 hundred + 15 tens + 9 ones</b>  | <b>131</b> |
| <b>15 tens + 15 ones</b>             | <b>240</b> |
| <b>1 hundred + 10 tens + 10 ones</b> | <b>165</b> |
| <b>1 hundred, 12 tens, 20 ones</b>   | <b>259</b> |

26. There are 3 bakers. Each baker has 3 pans. Each pan has 9 cupcakes. Which expression can be used to find the total number of cupcakes?

- (A)  $3 \times 9$
- (B)  $3 + 3 + 9$
- (C)  $3 \times 3 \times 9$
- (D)  $3 \times 3 + 9$

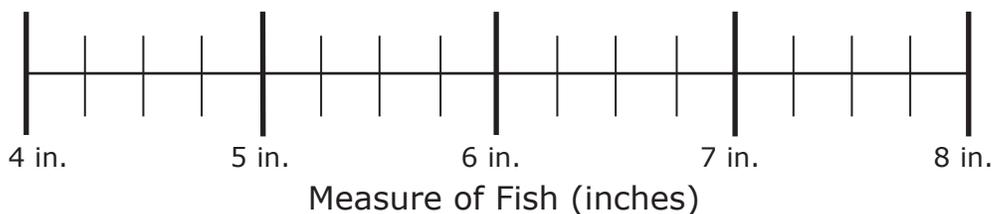
27. Dalton is filling his fish tank with water. About how much water will he need?

- (A) 1 liter
- (B) 20 liters
- (C) 40 grams
- (D) 4 liters

28. Eric and his dad competed in a fishing tournament. The table below shows the lengths of each fish they caught.

Fish	Length (inches)
1	$4 \frac{1}{2}$ in.
2	5 in.
3	$7 \frac{1}{2}$ in.
4	$7 \frac{1}{2}$ in.
5	4 in.
6	5 in.
7	$4 \frac{1}{2}$ in.

Create a line plot that shows the lengths of the fish they caught.

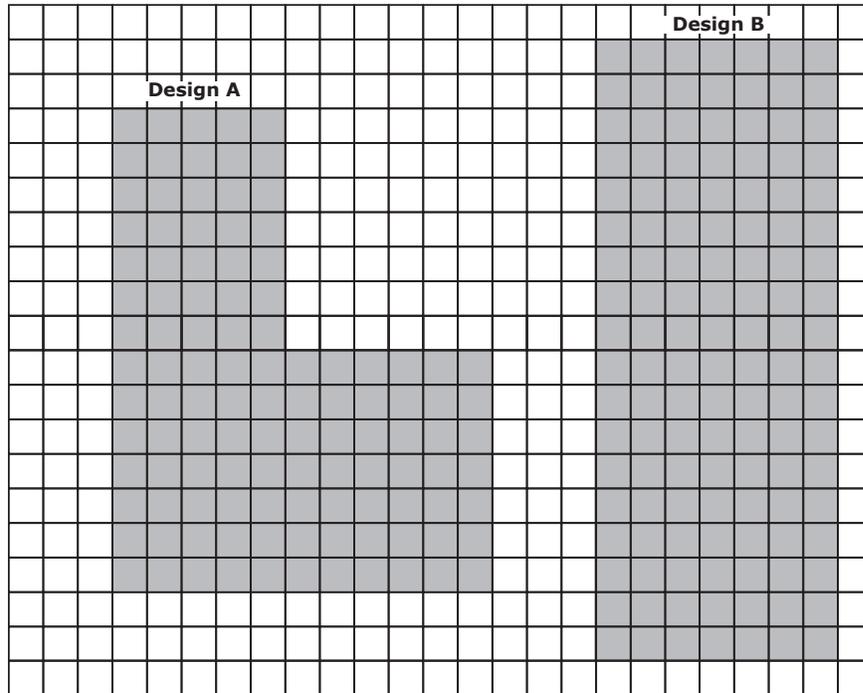


29. What fraction makes the equation true?

$$\frac{1}{4} = \frac{\square}{\square}$$

- Ⓐ  $\frac{4}{4}$
- Ⓑ  $\frac{2}{8}$
- Ⓒ  $\frac{1}{2}$
- Ⓓ  $\frac{4}{1}$

30. The school wants to build a community garden. Two possible designs for the garden are on the grid below. Each unit length on the grid equals a length of 1 foot.



**Part A**

What expression can be used to find the total area of Design A?

- Ⓐ  $11 \times 14$
- Ⓑ  $(11 \times 7) + (11 \times 7)$
- Ⓒ  $(6 \times 14) + (5 \times 14)$
- Ⓓ  $(11 \times 7) + (5 \times 7)$

**Part B**

What is the total area of Design A?

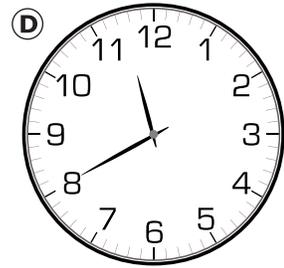
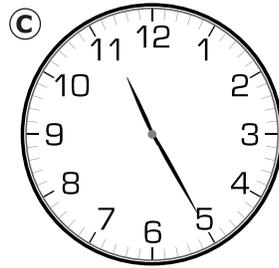
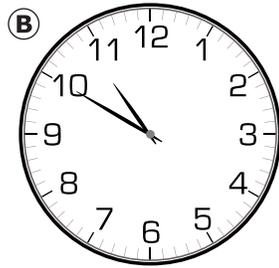
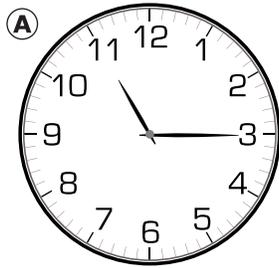
Answer: \_\_\_\_\_ square feet

**Part C**

How much greater is the area of Design B than Design A?

Answer: \_\_\_\_\_ square feet

31. Sally starts eating lunch at 11:15. She finishes eating lunch 25 minutes later. Which clock shows the time that Sally finishes eating lunch?



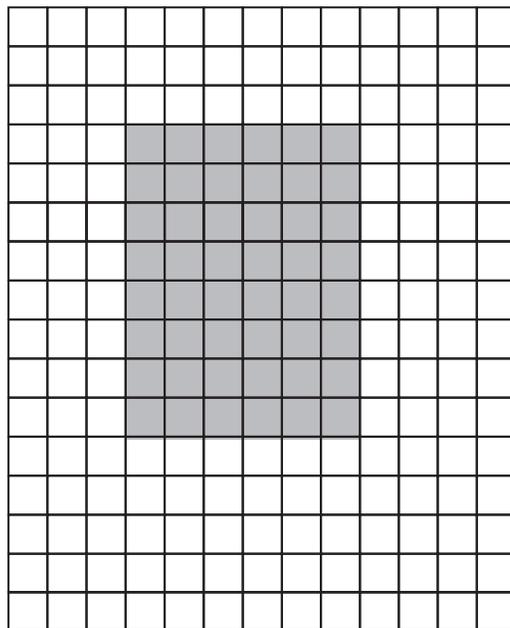
32. Look for patterns and complete the table.

<b>Number of Tricycles</b>	0	2	4	6	8	10	12	14
<b>Number of Wheels</b>	0	6		18		30		

33. Jimmy has 24 sports cards. Nora has twice as many sports cards as Jimmy. Alexa has 10 fewer cards than Nora. How many sports cards do they have altogether?

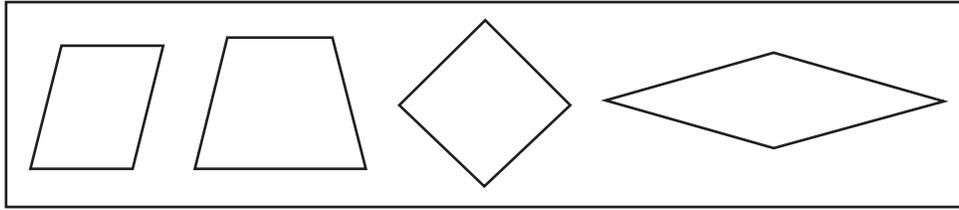
Answer: \_\_\_\_\_

34. The area of the rectangle below is 48 square units. What is the area of one-fourth of the rectangle?



Answer: \_\_\_\_\_ square units

35. A set of shapes is shown.



**Part A**

Name a geometric attribute that all the shapes above have in common.

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**Part B**

In the space below, draw a different shape that shares the same attribute as the shapes above.

36. Select **ALL** the fractions that are greater than  $\frac{1}{2}$  and less than 1 whole.

- $\frac{1}{1}$
- $\frac{2}{4}$
- $\frac{3}{4}$
- $\frac{7}{8}$
- $\frac{2}{1}$
- $\frac{4}{6}$

37. What expression can be used to find the total number of stars in the model?



- (A)  $4 \times (3 \times 2)$
- (B)  $4 + (3 + 2)$
- (C)  $6 + 4$
- (D)  $6 \times (3 \times 2)$

38. Megan has 96 craft sticks. Megan's mom bought her a box of 275 craft sticks. How many craft sticks does Megan have altogether?

Answer: \_\_\_\_\_

- (A) 275
- (B) 179
- (C) 371
- (D) 261

39. Shade the figure to show a fraction that is less than  $\frac{1}{2}$ .

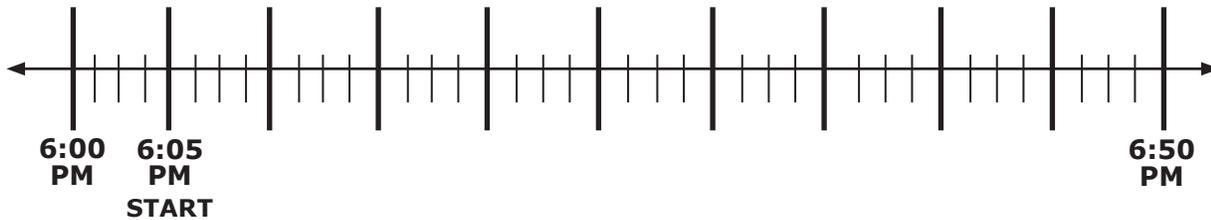


40. What unknown number makes this equation true?

$$9 = 72 \div \square$$

- (A) 9
- (B) 63
- (C) 8
- (D) 81

41. The number line shows the time Divya started her homework. It took Divya 40 minutes to do her homework. Mark the point on the number line that shows the time Divya finished her homework.



42. Tamara has \$26.00 left after her vacation in Walt Disney World. She spent \$23.00 on Mickey Ears, \$65.00 on food, \$174.00 on clothes, and \$37.00 on stuffed animals. How much money did Tamara have at the beginning of her trip? Show your work using pictures, numbers, or words.

How do you know that your answer is reasonable? Explain your thinking.

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43. Fill each equation a symbol that makes the number sentence true.

$$45 \square 9 = 5$$

$$45 \square 9 = 36$$

$$9 \square 5 = 45$$

$$9 \square 5 = 14$$

44. Which of the following sets has the fractions listed in order from least to greatest?

Choose **ALL** answers that apply.

$\frac{4}{1}, \frac{3}{1}, \frac{2}{1}, \frac{1}{1}$

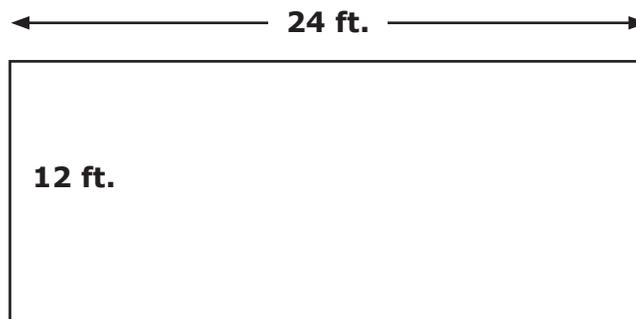
$\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{1}{1}$

$\frac{1}{1}, \frac{2}{1}, \frac{3}{1}, \frac{4}{1}$

$\frac{1}{1}, \frac{2}{2}, \frac{3}{3}, \frac{4}{4}$

$\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{4}{4}$

45. Which expression could be used to find the total area of the rectangle below?



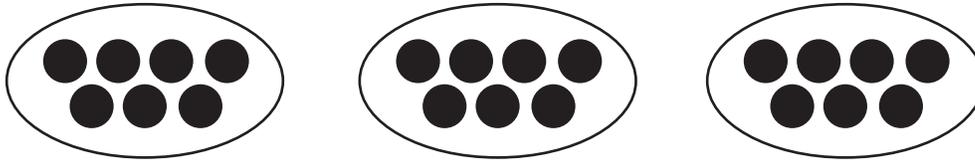
(A)  $12 + 24$

(B)  $12 + 24 + 12 + 24$

(C)  $(12 \times 24) + (12 \times 24)$

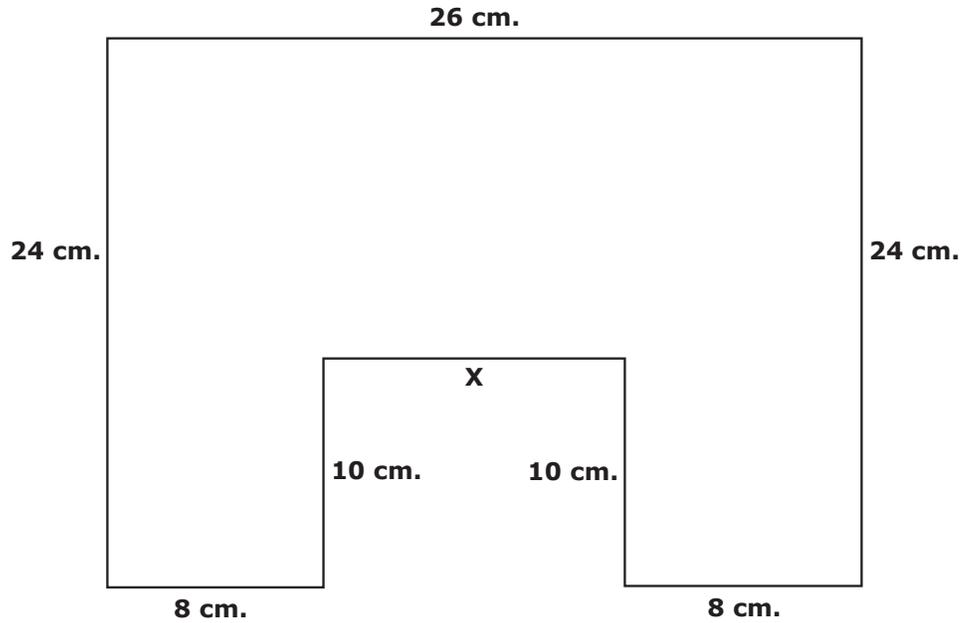
(D)  $(12 \times 12) + (12 \times 12)$

46. Which equation does the model below represent?



- (A)  $21 \div 3 = 7$
- (B)  $3 \div 7 = 21$
- (C)  $7 \div 3 = 21$
- (D) None of the above.

47.



**Part A**

What is the value of X?

Answer: \_\_\_\_\_ cm.

**Part B**

What is the total perimeter of the figure above?

Answer: \_\_\_\_\_ cm.

48. Jefferson Elementary School wants to build a new school garden. The garden will be 20 feet long and 50 feet wide. How much soil will they need for the garden?

Answer: \_\_\_\_\_ square feet

49. What unknown variable makes this equation true?

$$28 \times 2 = (20 \times 2) + (\square \times 2)$$

Answer: \_\_\_\_\_

50. Carla is using a pan balance to find the mass of a tennis ball. Right now, the tennis ball is in one pan and 25 grams of weights are in the other pan. The pan with the tennis ball still has less mass than the pan with the weights. What could be the possible mass of the tennis ball?



- Ⓐ 50 grams
- Ⓑ 50 kilograms
- Ⓒ 5 grams
- Ⓓ 20 grams

51. Which of the following equations is **NOT** true?

- Ⓐ  $5 \times (2 \times 3) = 5 \times 6$
- Ⓑ  $6 \times 5 = 5 \times 6$
- Ⓒ  $(3 \times 4) + (3 \times 6) = 9 \times 24$
- Ⓓ  $(5 \times 2) \times 3 = (2 \times 3) \times 5$

52. The mass of Melissa's dog is 10 kilograms. The mass of Danny's dog is 35 kilograms. How much more is the mass of Danny's dog than Melissa's dog?

Answer: \_\_\_\_\_ kilograms

53. A pizza has 12 slices. 2 slices have sausage, 2 slices have vegetables, and the rest are plain cheese. What fraction of the pizza is plain cheese?

- Ⓐ  $\frac{4}{12}$
- Ⓑ  $\frac{6}{12}$
- Ⓒ  $\frac{8}{12}$
- Ⓓ 6

54. Chloe says that any odd number times any odd number will always be an odd number. Do you agree with Chloe? Explain your thinking using pictures and words.

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55. There are 5 bags of carrots. Each bag has 12 carrots. What two equations can be used to find the total number of carrots?

- Ⓐ  $5 \times 12$  **and**  $12 + 5 + 12 + 5$
- Ⓑ  $12 \div 5$  **and**  $5 \div 12$
- Ⓒ  $(5 \times 6) + (5 \times 6)$  **and**  $(12 \times 5) + (12 \times 5)$
- Ⓓ  $5 \times 12$  **and**  $(5 \times 6) + (5 \times 6)$

56. A third grade class took a poll to find out students' favorite movie. The pictograph below shows the results of the poll.

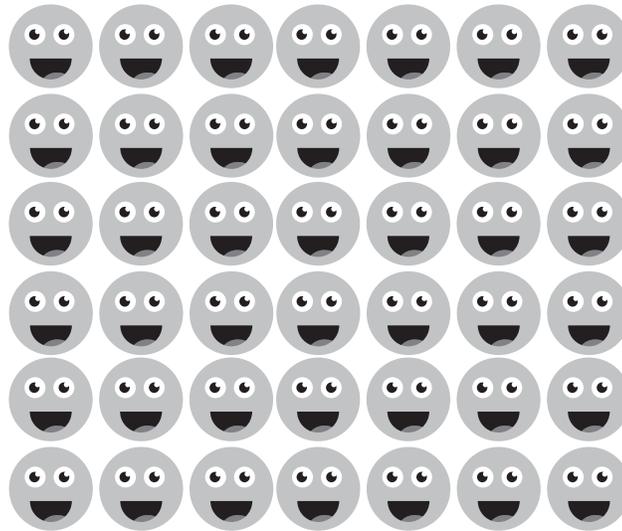
Item	Number Sold
<i>Frozen</i>	
<i>The Lego Movie</i>	
<i>Harry Potter and the Sorcerer's Stone</i>	
<i>Charlie and the Chocolate Factory</i>	
<i>The Secret Life of Pets</i>	

Each  = 2 students.

How many more students voted for The Lego Movie than Charlie and the Chocolate Factory?

Answer: \_\_\_\_\_ students

57. Which two equations can be used to represent the model below?



- (A)  $6 \times 7$  **and**  $42 \div 6$
- (B)  $42 \times 6$  **and**  $42 \times 7$
- (C)  $42 \div 6$  **and**  $42 \div 7$
- (D)  $6 + 7$  **and**  $7 + 6$

58. Peter bought 3 pencils for 90 cents each. If he paid with a 5 dollar bill, how much change should Peter receive?

Answer: \_\_\_\_\_

59. Complete the pattern below.

**500, 250, 300, 150, 200, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_**

60. Which unknown number makes both equations true?

$$132 \div \square = 11$$

$$\square \times 9 = 108$$

Answer: \_\_\_\_\_



**Mathematics**  
**Practice Test Two**  
**Answer Key &**  
**Explanations**

## Mathematics Practice Test Two

### Answer Explanations

1. **D.**  $48 = 6 \times 8$

Due to the unknown variable being placed at the beginning of the number sentence, students may misinterpret the question as:  $48 - X$ . In this case, they may subtract instead of multiply.

**Difficulty Level: Medium**

**Standard: 3.OA.A.4**

2. **See detailed explanation.** Student charts should be filled in like the chart below:

Number	Round to the Nearest 10	Round to the Nearest 100
324	320	300
86	90	100
950	950	1,000
148	150	100

**Difficulty Level: Easy**

**Standard: 3.NBT.A.1**

3. **A.** The problem states that Amy has 72 dominoes and places them in rows of 9. To determine how many rows of dominoes Amy has, you need to divide.  $72 \div 9 = 8$  rows of dominoes

**Difficulty Level: Easy**

**Standard: 3.OA.A.3**

4. **See detailed explanation.** If the total area of the rectangle is 200 square feet and you are trying to shade an area of 75 square feet, you first need to determine how much each shaded portion is worth.

If the total area of the rectangle is 200 square feet and it is partitioned into 8 equal parts, then each part is equal to 25 square feet.  $200 \div 8 = 25$ .

If you need to shade an area of 75 square feet, you need to divide:  $75 \div 25 = 3$ . Therefore, you need to shade 3 parts of the rectangle.

**Difficulty Level: Hard**

**Standard: 3.GA.A.2**

5. **C.** First, you need to determine how many miles the Martinez Family has driven on Day 1 and Day 2. If they traveled 1,000 miles on Day 1 and 880 miles on Day 2, then they drove 1,880 miles so far. To determine how many miles are left to drive, you need to subtract the number of miles they've driven so far from the total number of miles of the trip:  $3,125 - 1,880 = 1,245$  miles

**Difficulty Level: Medium**

**Standard: 3.OA.D.8**

6.  $<, =, = \frac{1}{3}$  is less than the fraction  $\frac{3}{3}$ . The parts are all the same size, so 1 part is smaller than 3 parts. Also,  $\frac{3}{3}$  is equivalent to one-whole.

$\frac{2}{2}$  is equal to  $\frac{3}{3}$ . Even though the parts are not the same size, they both represent one-whole.

$\frac{1}{2}$  is equal to than  $\frac{6}{12}$ . The fraction  $\frac{1}{2}$  represents 1 out of 2 parts and the fraction  $\frac{6}{12}$  represents 6 out of 12 parts. Both fractions are equal to one-half.

**Difficulty Level: Medium**

**Standard: 3.NF.A.3**

7. **279. 861 - 279 = 582**

Due to the unknown variable being in the middle of the number sentence, students may misinterpret the question as:  $582 + 861$ . In this case, they may add instead of subtract.

**Difficulty Level: Medium**

**Standard: 3.NBT.A.2**

8. **See detailed explanation.** The clue words each and altogether indicate that you need to multiply or use repeated addition to determine how many treats there were in the bags altogether. The expressions that can be used to find the total number of treats are:  $6 \times 6$ ,  $(6 + 6) + (6 + 6) + (6 + 6)$ , and  $12 + 12 + 12$ . Each of these expressions has a total of 36 treats.

**Difficulty Level: Medium**

**Standard: 3.OA.D.8**

9. **Appropriately decomposed shape; 4 feet; 72 feet. Part A:** Students can draw a line that decomposes the larger shape into 3 smaller rectangles in two different ways:

#1:  $(12 \times 9) + (6 \times 4) + (10 \times 7)$

# 2:  $(6 \times 9) + (4 \times 7) + (20 \times 6)$

**Part B:** No matter how students decompose the shape, the value of X is 4 feet.

We know that the value of X is 4 feet because the line that is parallel to the X has a value of 20. When we look at the sides that are then parallel to the 20 feet, we see that 1 line has a value of 9 and the other line has a value of 7. These 3 sides must be of equivalent to the value of the parallel line, measuring 20 feet. This means the value of X needs to be 4 because  $9 + 7 + 4 = 20$  feet.

**Part C:** To find the perimeter of the figure, you need to add all the side lengths together:  $20 + 12 + 9 + 6 + 4 + 4 + 7 + 10 = 72$  feet

**Difficulty Level: Hard**

**Standard: 3.MD.D.8**

10. **4; 3.** This question measures students' ability to apply their understanding of the properties of multiplication.

$5 \times 9 = (5 \times 5) + (5 \times \square)$  is an example of the Distributive Property. The Distributive Property states that you can multiply each addend separately and then add the products together to get a total sum. Therefore,  $5 \times 9 = (5 \times 5) + (5 \times 4) = 45$

$4 \times 2 \times 3 = 8 \times \square$  is an example of the Associative Property. The Associative Property states that you can group the factors you are multiplying in different ways, but your product will remain the same.

Therefore,  $4 \times 2 \times 3 = 8 \times 3 = 24$

**Difficulty Level: Medium**

**Standard: 3.OA.B.5**

11. **See detailed explanation.** The first number line starts at 0, ends at 1, and is divided into 4 equal parts. Therefore, this number line can represent the fractions:  $\frac{1}{4}$  and  $\frac{2}{4}$ .

The second number line starts at 0, ends at 4, and is divided into 4 equal parts. Therefore, this number line can represent the fraction:

$\frac{4}{2}$ . This is the only fraction that can fit on this number line because it is the only fraction greater than 1.

The third number line starts at 0, ends at 1, and is divided into 8 equal parts. Therefore, this number line can represent the fractions:  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{2}{8}$ ,  $\frac{4}{8}$ , and  $\frac{8}{8}$ . The fractions  $\frac{1}{4}$  and  $\frac{2}{8}$  should be labeled on the second tick mark. The fractions  $\frac{2}{4}$  and  $\frac{4}{8}$  should be labeled on the fourth tick mark. The fraction  $\frac{8}{8}$  should be labeled on the last tick mark, the 1.

**Difficulty Level: Hard**

**Standard: 3.NF.A.3**

12. **Yes; Appropriate explanation; Appropriate illustration.** Yes, Trevor is correct. An appropriate student explanation may state: Yes, Trevor is correct. I know this because  $6 \times 8 = 48$  and  $6 \times 80 = 480$ . Since you are multiplying by a multiple of 10, you only need to add a zero to 48.

Students may draw an illustration that shows 6 groups of 8 and 6 groups with 8 tens in each group.

**Difficulty Level: Medium**

**Standard: 3.NBT.A.3**

13. **83 inches.** The key words *entire winter* indicate that you need to add the snow totals from each month altogether.  $22$  (Dec.)  $+ 25$  (Jan.)  $+ 15$  (Feb.)  $+ 21$  (March)  $= 83$  inches

**Difficulty Level: Medium**

**Standard: 3.MD.B.3**

14. **D.** Multiplication and division are inverse or opposite operations. In this example, students need to relate the unknown variable in the division equation as an unknown variable in an opposite multiplication equation.  $42 \div 6 = N$  is the same thing as  $N \times 6 = 42$ .

**Difficulty Level: Medium**

**Standard: 3.OA.A.4**

15. **A.** The crayon extends from the end of the ruler to the first tick mark after 3 inches. To the nearest quarter inch, the crayon measures  $3 \frac{1}{4}$  inches.

**Difficulty Level: Easy**

**Standard: 3.MD.B.4**

16. **D.** If Maria has 8 dollars in her wallet and we know that  $\frac{1}{2}$  of her dollars are in her wallet, we need to determine what number 8 is half of.  $8 \times 2 = 16$  which means Maria has 16 dollars in all. The equation that shows how many dollars Maria has in all is  $\frac{1}{2} = \frac{8}{16}$ .

**Difficulty Level: Medium**

**Standard: 3.NF.A.3**

17. **9.** Before you can determine how many blue pens Destiny has, you first need to determine how many black and red pens she has altogether. If she has 12 black pens and 9 red pens, she has 21 black and red pens altogether. Next, you need to subtract the number of black and red pens from the total number of pens Destiny has altogether, 30.  $30 - 21 = 9$  blue pens.

**Difficulty Level: Easy**

**Standard: 3.OA.D.8**

18. **D.** There is not enough information to determine if the number could be a multiple of 3 or 9. For example, if the number was 19, that would neither be a multiple of 3 nor 9. Since 9 is an odd number, the number would not be even with a 9 in the ones place. Therefore, none of the above answer choices are correct.

**Difficulty Level: Medium**

**Standard: 3.OA.D.9**

19. **B.** Clock A shows the time 6:31. Clock B shows the time 8:45. 2 hours and 14 minutes passes between Clock A and Clock B.

**Difficulty Level: Medium**

**Standard: 3.MD.A.1**

20. **1st, 2nd, and 5th Choices.** The 1st, 2nd, and 5th statements are true. Trapezoids and parallelograms have the same number of sides because they are both examples of quadrilaterals.

All parallelograms are quadrilaterals because they all have 4 sides. All rectangles are parallelograms because they have 2 pairs of parallel sides.

Rectangles cannot be squares because they do not have all equal sides. All quadrilaterals are not squares, because quadrilaterals can also be: rectangles, trapezoids, rhombuses, and parallelograms.

**Difficulty Level: Hard**

**Standard: 3.G.A.1**

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21. **141.**  $400 - 259 = 141$

Due to the unknown variable being placed at the beginning of the number sentence, students may misinterpret the question as:  $X - 400 = 259$ . In this case, they may add instead of subtract.

**Difficulty Level: Medium**

**Standard: 3.NBT.A.2**

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22. **B.**  $48 \div 4 = 12$

$$4 \times 6 = 24$$

**Difficulty Level: Easy**

**Standard: 3.OA.A.4**

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23. **10.** In order to determine how much each pencil symbol is worth, students need to guess and check using the total number of items sold as a guide. Since the total number of items sold is 115 and there are 5 ones in 115, students should recognize that the pencil symbol can only represent 5 or 10. Students should further recognize that each pencil cannot represent 5 items because then HALF a pencil would represent 2.5 items, which is impossible. Therefore, each pencil symbol represents 10 items sold and each HALF pencil symbol represents 5 items sold.

**Difficulty Level: Hard**

**Standard: 3.MD.B.3**

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24. **No; Appropriate explanation; Appropriate illustration.** This question measures a student's ability to understand a whole as a fraction. An appropriate student explanation may state: No, I do not agree with Julian because the fractions are equal. The number of parts and the size of the parts is not important because all parts are shaded.  $8/8$  is equal to  $4/4$  because they are both equal to 1 whole.

An appropriate student illustration may show a rectangle divided into 8 equal parts with all 8 parts shaded and a rectangle divided into 4 equal parts with all 4 parts shaded.

**Difficulty Level: Medium**

**Standard: 3.NF.A.3**

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25. **See detailed explanation.** 12 tens + 11 ones should be matched to 131

1 hundred + 15 tens + 9 ones should be matched to 259

15 tens + 15 ones should be matched to 165

1 hundred + 10 tens + 10 ones should be matched to 210

1 hundred + 12 tens + 20 ones should be matched to 240

**Difficulty Level: Medium**

**Standard: 3.NBT.A.2**

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26. **C.** This question measures a student's ability to apply the properties of multiplication into a word problem. This word problem can be solved by using the Associative Property. In order to determine the total number of cupcakes, you need to multiply the number of bakers by the number of pans each baker has by the number of cupcakes on each pan:  $3 \times 3 \times 9 = 81$  cupcakes altogether

**Difficulty Level: Medium**

**Standard: 3.OA.B.5**

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27. **B.** Grams cannot be used to measure liquids. 1 liter and 4 liters are too small to fill a fish tank.

**Difficulty Level: Easy**

**Standard: 3.MD.2**

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28. **Accurately drawn line plot.** To correctly draw the line plot, students must place the appropriate number of marks above each measurement.

There should be 2 marks above  $4 \frac{1}{2}$  inches.

There should be 2 marks above 5 inches.

There should be 2 marks above  $7 \frac{1}{2}$  inches.

There should be 1 mark above 4 inches.

**Difficulty Level: Medium**

**Standard: 3.MD.B.4**

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29. **B.** The fraction  $\frac{1}{4}$  is equivalent to the fraction  $\frac{2}{8}$ . The fractions  $\frac{4}{4}$ ,  $\frac{1}{2}$ , and  $\frac{4}{1}$  are all greater than the fraction  $\frac{1}{4}$ .

**Difficulty Level: Medium**

**Standard: 3.NF.A.3**

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30. **D; 112; 24 more square feet. Part A:** To find the total area of Design A, it needs to be decomposed into 2 smaller rectangles. One rectangle will have the dimensions  $11 \times 7$  and the other rectangle will have the dimensions  $5 \times 7$ . You need to find the area of each of the smaller rectangles and then add them together:  $(11 \times 7) + (5 \times 7)$ .

**Part B:**  $(11 \times 7) + (5 \times 7) = 112$  square feet

**Part C:** Before you can determine how much larger the area of Design B is than Design A, you first need to find the area of Design B. Design B is a rectangle with the dimensions  $18 \times 7$  with a total area of: 126 square feet. Next, you need to subtract the area of

Design A from the area of Design B:  $126 - 112 = 24$  more square feet

**Difficulty Level: Medium**  
**Standard: 3.MD.C.7**

31. **D.** If Sally starts eating lunch at 11:15 and she eats for 25 minutes, that means she stops eating at 11:40.

**Difficulty Level: Medium**  
**Standard: 3.MD.1**

32. **Correctly filled in table.** The chart indicates that you are counting the number of wheels on various numbers of tricycles. Students should recognize that the pattern is multiplying the number of tricycles by 3 because each tricycle has 3 wheels.

Student charts should resemble the chart below:

Number of Tricycles	0	2	4	6	8	10	12	14
Number of Wheels	0	6	12	18	24	30	36	42

**Difficulty Level: Medium**  
**Standard: 3.OA.D.9**

33. **110 sports cards.** Before you can determine how many sports cards Jimmy, Nora, and Alexa have altogether, you need to find out how many sports cards they each have. If Nora has twice as many cards as Jimmy, and Jimmy has 24 cards, that means Nora has 48 cards. ( $24 + 24 = 48$ .) If Alexa has 10 fewer cards than Nora, then she has 38 cards. ( $48 - 10 = 38$ ). Lastly, you need to add up the number of cards each person has altogether to determine the total number of cards they have:

$$24 + 48 + 38 = 110 \text{ sports cards}$$

**Difficulty Level: Medium**  
**Standard: 3.OA.D.8**

34. **12 square units.** The total area of the rectangle is 48 square units. To determine the area of one-fourth of the rectangle, you need to divide 48 into 4.  $48 \div 4 = 12$ .

This question can be particularly challenging for students because the rectangle has the dimensions of  $8 \times 6$ , making it more challenging to simply use the pictorial representation to find one-fourth of the rectangle.

**Difficulty Level: Hard**  
**Standard: 3.G.2**

35. **Appropriate attribute; Appropriately drawn shape. Part A:** Some of the geometric attributes that the shapes have in common are: they are all quadrilaterals, they all have 4 sides, they all have 4 angles, they all have at least 1 set of parallel lines.

**Part B:** Students can draw a rectangle, square,

or any other four-sided figure, depending on the attribute they selected for Part A.

**Difficulty Level: Medium**  
**Standard: 3.G.A.1**

36. **3rd, 4th, and 6th Choices.** The 3rd, 4th, and 6th answer choices are fractions that are greater than  $\frac{1}{2}$  and less than 1 whole. The fraction  $\frac{1}{1}$  is equal to 1 whole, the fraction  $\frac{2}{4}$  is equal to  $\frac{1}{2}$ , and the fraction  $\frac{2}{1}$  is greater than 1 whole.

**Difficulty Level: Hard**  
**Standard: 3.NF.A.3**

37. **A.** The model of stars is a representation of the Associative Property. There are 4 groups of stars and each group shows a  $3 \times 2$  array.  $4 \times (3 \times 2)$  is the expression that can be used to find the total number of stars.

**Difficulty Level: Medium**  
**Standard: 3.OA.B.5**

38. **C.** The clue word *altogether* indicates that you need to add to determine how many craft sticks Megan has.  $275 + 96 = 371$  craft sticks.

**Difficulty Level: Medium**  
**Standard: 3.NBT.2**

39. **Appropriately shaded figure.** Students can shade either  $\frac{1}{6}$  or  $\frac{2}{6}$  of the figure.  $\frac{3}{6}$  is equal to  $\frac{1}{2}$ .  $\frac{4}{6}$ ,  $\frac{5}{6}$ , and  $\frac{6}{6}$  are all greater than  $\frac{1}{2}$ .

**Difficulty Level: Medium**  
**Standard: 3.NF.B.3**

40. **C.**  $72 \div 9 = 8$

Due to the unknown variable being placed in the middle of the number sentence, students may misinterpret the question. In this case, they may add or subtract instead. They may also have trouble interpreting the number sentence as a division equation with the numbers arranged in an order which students may not typically see.

**Difficulty Level: Medium**  
**Standard: 3.OA.B.6**

41. **Accurately labeled number line.** Each tick mark on the number line represents a 1-minute interval. Divya begins her homework at 6:05 PM and does her homework for 40 minutes. 40 minutes after 6:05 is 6:45. Students should draw a label above the tick mark that represents 6:45 PM. This tick mark is the 10th long tick mark on the number line.

**Difficulty Level: Medium**  
**Standard: 3.MD.A.1**

42. **\$325.00, appropriate explanation.** This two-step word problem is unlike most two-step word problems students encounter in that it requires them to add and then add again. First, you need to determine how much money Tamara spent in Walt Disney World altogether.  $\$23.00$  (Mickey Ears) +  $\$65.00$  (food) +  $\$174.00$  (clothing) +  $\$37.00$  (stuffed animals) =  $\$299.00$ . Next, you need to add this amount to the amount of money Tamara has left at the end of her trip:  $\$299.99 + \$26.00 = \$325.00$ .

An appropriate student explanation may state: I know my answer is reasonable because Tamara spent about  $\$20.00$  on Mickey Ears,  $\$65.00$  on food,  $\$170.00$  on clothing, and  $\$40.00$  on stuffed animals.  $20 + 65 + 170 + 40 = \$295$ . If she had about  $\$30.00$  left at the end of her trip, that means she started with about  $\$325.00$ .  $\$295.00 + \$30.00 = \$325.00$

Student explanations should indicate how they used mental math and/or rounding to determine if their answer is reasonable.

**Difficulty Level: Hard**

**Standard: 3.OA.B.8**

43.  $\div$ ,  $-$ ,  $\times$ ,  $+$  This question measures a student's ability to apply their fact fluency for addition, subtraction, multiplication, and division.

$$45 \div 9 = 5$$

$$45 - 9 = 36$$

$$9 \times 5 = 45$$

$$9 + 5 = 14$$

**Difficulty Level: Medium**

**Standard: 3.OA.C.7 3.NBT.A.2**

44. **2nd, 3rd, and 5th Choices.** Students should have selected the 2nd, 3rd, and 5th answer choices.

The 1st answer choice shows fractions in order from greatest to least. The 4th answer choice shows all equivalent fractions.

**Difficulty Level: Hard**

**Standard: 3.NF.A.3**

45. **D.** This question measures a student's ability to apply the distributive property to find the area of a rectangle. The dimensions of the rectangle are  $12 \times 24$ . The distributive property can be used to solve this problem by adding  $(12 \times 12) + (12 \times 12)$ .

$$12 \times 24 = 288$$

$$(12 \times 12) = 144 + (12 \times 12) = 288$$

**Difficulty Level: Hard**

**Standard: 3.MD.C.7**

46. **A.** The model shows 3 groups of 7. The only number sentence that matches the model is  $21 \div 3$

= 7. Students may choose the option of *None of the above* if they feel that the model can only represent multiplication

**Difficulty Level: Easy**

**Standard: 3.OA.A.2**

47. **10 cm.; 120 cm. Part A:** We know that the value of X is 10 cm. because the line that is parallel to the x has a value of 26 cm. When we look at the sides that are then parallel to the 26 cm, we see that 2 of the lines have a value of 8 cm. These 3 sides must be equivalent to the value of the parallel line, measuring 26 cm. This means the value of X needs to be 10 because  $8 + 8 + 10 = 26$  cm.

**Part B:** To find the total perimeter of the figure, you need to add all the side lengths together:

$$26 + 24 + 8 + 10 + 10 + 10 + 8 + 24 = 120 \text{ cm.}$$

**Difficulty Level: Hard**

**Standard: 3.MD.D.8**

48. **1,000 square feet.** To determine how much soil will be needed for the garden, you need to find the area. Since the length of the garden is 20 feet and the width of the garden is 50 feet, you need to multiply  $50 \times 20$ . This question measures not only a student's ability to find area, but also a student's ability to apply their understanding of multiplying by multiples of 10.

$$50 \times 20 = 1,000 \text{ square feet}$$

**Difficulty Level: Medium**

**Standard: 3.MD.C.7**

49. **8.** This question measures a student's ability to apply their understanding of the Distributive Property. In the equation

$28 \times 2 = (20 \times 2) + (? \times 2)$ , the 28 is being distributive as  $20 +$  what number? Therefore, the unknown variable must be 8.

$$28 \times 2 = (20 \times 2) + (8 \times 2) = 56$$

**Difficulty Level: Medium**

**Standard: 3.OA.5**

50. **A.** Since the mass of the tennis ball is still more than the mass of the 25 grams of weights, the total mass of the tennis ball cannot be anything less than 25 grams. 50 kilograms is too much, so the tennis ball could have a mass of about 50 grams

**Difficulty Level: Medium**

**Standard: 3.MD.2**

51. **C.** This question measures a student's ability to apply their understanding of the properties of multiplication. Letters A and D correctly demonstrate the Associative Property. Letter B correctly demonstrates that Commutative Property.

Letter C incorrectly demonstrates the Distributive Property.

Letter C states:  $(3 \times 4) + (3 \times 6) = 9 \times 24$ .

The correct way to apply the Distributive Property to this equation is:

$$(3 \times 4) + (3 \times 6) = 3 \times 10$$

**Difficulty Level: Medium**

**Standard: 3.OA.B.5**

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52. **25 kilograms.** The key words how much more mass indicate that you need to subtract the mass of Melissa's dog from the mass of Danny's dog.  $35 \text{ kilograms} - 10 \text{ kilograms} = 25 \text{ more kilograms}$

**Difficulty Level: Easy**

**Standard: 3.MD.A.2**

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53. **C.** There are 12 slices of pizza. Each block is worth  $\frac{1}{12}$ . 2 slices have sausage and 2 slices have vegetables. That takes 4 slices of pizza. If the rest of the slices are plain cheese you need to subtract  $12 - 4$ .

$12 - 4 = 8$  which means  $\frac{8}{12}$  of the pizza is plain cheese.

**Difficulty Level: Medium**

**Standard: 3.NF.A.1**

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54. **Yes: Appropriate explanation.** Chloe is correct because any odd number times any odd number will always be an odd number. An appropriate student explanation may state:

Chloe is correct. Some examples that prove this are:  $3 \times 3 = 9$ .  $7 \times 7 = 49$ .  $9 \times 9 = 81$ . Any odd number times any odd number will always equal another odd number.

**Difficulty Level: Medium**

**Standard: 3.OA.D.9**

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55. **D.** The clue words each and total indicate that you need to use multiplication or repeated addition to solve this problem. You can multiply the number of bags by the number of carrots in each bag:  $5 \times 12$ . You can also use the distributive property to decompose the 12:  $(5 \times 6) + (5 \times 6)$ . Both equations have a total of 60.

**Difficulty Level: Medium**

**Standard: 3.OA.B.5**

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56. **5 students.** The key of the pictograph indicates that each bag of popcorn = 2 students. There are 4 popcorn bags next to The Lego Movie, which means 8 students voted for The Lego Movie. There are 1 and a half bags of popcorn next to Charlie and the Chocolate Factory which means 3 students voted for this movie. To determine how many more students voted for The Lego Movie than Charlie and the Chocolate Factory, you need to subtract:

$$8 - 3 = 5 \text{ more students}$$

**Difficulty Level: Medium**

**Standard: 3.MD.B.3**

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57. **A.** This question measures a student's ability to recognize the inverse relationship of multiplication and division. The model shows 6 rows of smiley faces with 7 smiley faces in each row for a total of 42 smiley faces. The 2 equations that can be represented through this model are  $6 \times 7$  and  $42 \div 6$ .

**Difficulty Level: Medium**

**Standard: 3.OA.C.7**

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58. **\$2.30.** To determine how much change Peter will get back, you must first find out how much money he spent. If Peter bought 3 pencils and each pencil cost 90 cents, you need to multiply  $90 \times 3$  to find the total cost.

$90 \times 3 = 270$  or \$2.70. Next, you need to subtraction \$2.70 from \$5.00 to determine how much change Peter received.

$$\$5.00 - \$2.70 = \$2.30$$

**Difficulty Level: Medium**

**Standard: 3.OA.D.8**

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59. **100; 150; 75.** The pattern is: a number divided by 2, and plus 50. Therefore, the next 3 numbers in the pattern are: 100, 150, 75

**Difficulty Level: Medium**

**Standard: 3.OA.9**

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60. **12.**  $132 \div 12 = 11$

$$12 \times 9 = 108$$

**Difficulty Level: Medium**

**Standard: 3.OA.A.4**

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