Mathematically Connected Communities
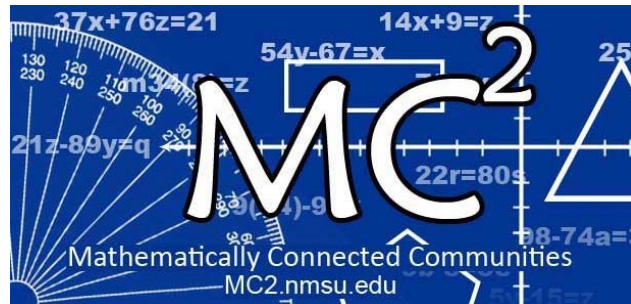
PARCC PBA Practice Test Items
6th Grade Mathematics

Mathematical Practice Questions for MC² Thinking Protocol

Follow the process below in working with the PARCC practice items found in this packet:

1. Choose items from this packet that relate to math concepts studied in the current or previous curriculum units during your math instruction. Each item may be used as a practice item worksheet.
2. Choose a set of **Thinking/Writing Prompts** below based on the math practice the class is working to develop.
3. Add the prompts to the practice item worksheet or display the prompts for the students to respond to.
4. Continue using the same set of prompts for an extended period of time so children develop competence and confidence in describing their mathematical thinking related to the math practice.

The questions below were intentionally not included on each MC² PARCC practice item worksheet in this packet. These are intended to help students move beyond "answer getting" to fully making sense of test item questions and their own mathematical thinking.

Thinking/Writing Prompts to Promote Mathematical Practices

Math Practice 1: **Make sense of problems and persevere in solving them.**
   1. What do you know about the problem?
   2. What questions do you have?
   3. Explain your reasoning or thinking in solving the problem.

Math Practice 3: **Construct viable arguments and critique the reasoning of others.**
   1. What are the assumptions, definitions, and previous knowledge to help in thinking about this problem?
   2. What are some possible conjectures that you have about the problem?
   3. Explain your mathematical argument so that somebody else can make sense of your thinking.

Math Practice 4: **Model with mathematics.**
   1. What are the important quantities in the problem that are needed to solve it?
   2. What mathematical operation(s) or representation(s) will you use to solve the problem?
   3. Explain how you know your answer makes sense in the context of the situation.

Math Practice 6: **Attend to precision.**
   1. What are the important units in the problem? (What are we measuring or counting?)
   2. What relationship between the units/quantities do you need to know in order to solve the problem?

Use appropriate and precise mathematical language, units, labels and computations to clearly describe your mathematical reasoning.
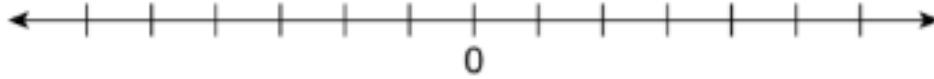
6th Grade PARCC PBA Practice Assessment Item #1: Standard 6.RP.1

1. A class of 25 students shares a class set of 100 markers. On a day with 5 students absent, which statement is true?

   Ⓐ For every 5 students, there is 1 marker.

   Ⓑ For every 4 students, there is 1 marker.

   Ⓒ For each student, there are 4 markers.

   Ⓓ For each student, there are 5 markers.

6th Grade PARCC PBA Practice Assessment Item #2: Standard 6.NS.6a

2. Each mark on the number line represents one unit. Plot a point on the number line that represents the opposite of ⁻5 units.

Select a place on the number line to plot the point.

3. The area of a rectangular patio is $5\frac{5}{8}$ square yards, and its length is $1\frac{1}{2}$ yards. What is the patio's width, in yards?
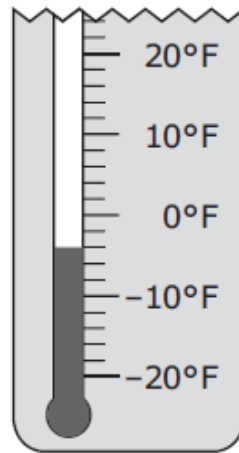
Ⓐ $3\frac{3}{4}$

Ⓑ $4\frac{1}{8}$

Ⓒ $7\frac{1}{8}$

Ⓓ $8\frac{7}{16}$

4. The picture shows part of a thermometer measuring temperature in degrees Fahrenheit.

What is the temperature, in degrees Fahrenheit, shown on the thermometer to the nearest integer?

5. Marshall took $36.75 to a fair. Each ticket into the fair costs x dollars. Marshall bought 3 tickets. Which expression represents the amount of money, in dollars, that Marshall had after he bought the tickets?

Ⓐ $36.75 - (3 + x)$

Ⓑ $36.75x - 3$

Ⓒ $36.75(3) - x$

Ⓓ $36.75 - 3x$

6. Which expression represents "6 more than x"?

○ A. $x - 6$

○ B. $6 \cdot x$

○ C. $x + 6$

○ D. $6 - x$

6ᵗʰ Grade PARCC PBA Practice Assessment Item #7: Standard 6.EE2c-1

7. Evaluate $5x^2 - 4$ when $x = 3$.

Enter your answer in the box.

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│          │
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8. Let x represent any number in the set of even integers greater than 1.

Which inequality is true for all values of x ?

○ A. $x < 0$

○ B. $x > 0$

○ C. $x < 4$

○ D. $x > 4$

9. The ratio of the sales tax to the amount of a purchase is a fixed number in Town Q. The table shows the sales tax for a purchase of $1,200.

Town Q Tax

Purchase	Sales Tax
$1,200	$72
$2,500	?
?	$108

9. **Part A**

What is the sales tax for a purchase of $2,500?

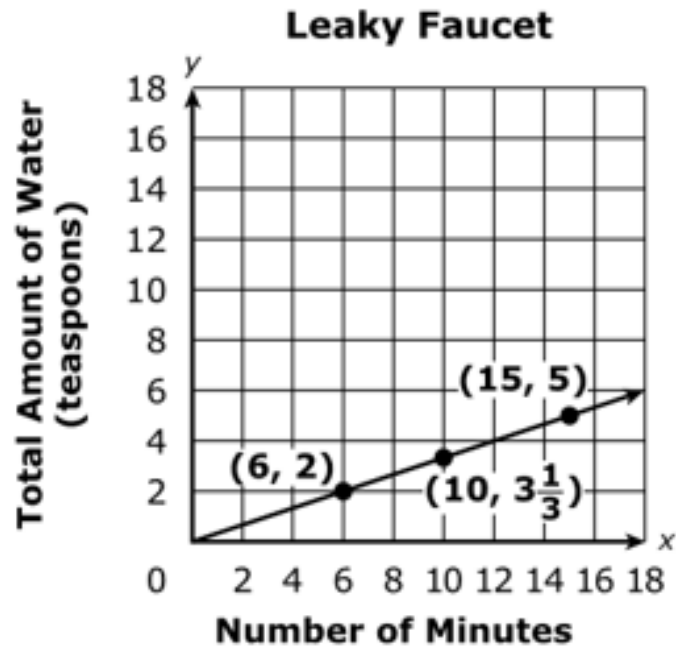Ⓐ $18.06

Ⓑ $34.72

Ⓒ $144.00

Ⓓ $150.00

Part B

What is the cost of an item with a sales tax of $108?

Ⓐ $432

Ⓑ $648

Ⓒ $1,092

Ⓓ $1,800

10. The graph shows the number of teaspoons of water, y, that have dripped from a leaky faucet at the end of x minutes.

Leaky Faucet

Part A

Which equation represents the relationship between x and y shown in the graph?

○ A. $y = 3x$

○ B. $y = x - 3$

○ C. $y = \frac{1}{3}x$

○ D. $y = x + 3$

Part B

Based on the relationship shown in the graph, how many teaspoons of water will have dripped from the faucet at the end of 21 minutes?
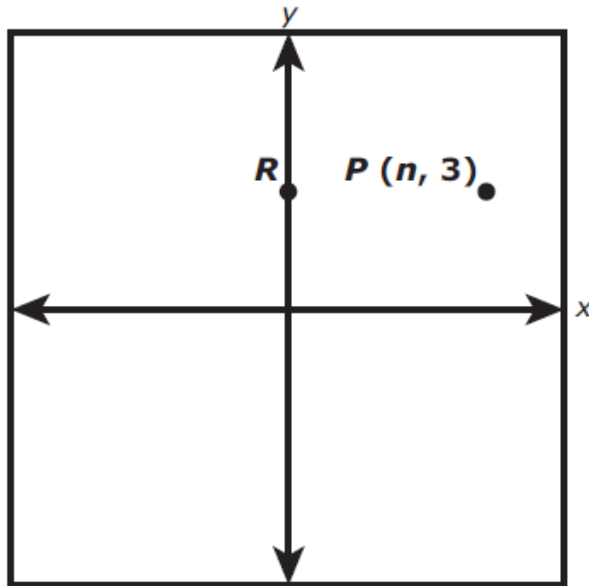
Enter your answer in the space provided. Enter **only** your answer.

11. The graph shows the location of point P and point R. Point R is on the y-axis and has the same y-coordinate as point P.

Point Q is graphed at $(n, -2)$. The distance from point P to point Q is equal to the distance from point P to point R.

What is the distance from point P to point Q? What is the value of n? Explain how you determined the distance from point P to point Q, and the value of n.

Enter your answers and your explanations in the space provided.

12. A company makes yellow golf balls and white golf balls. The table shows the company's sales of yellow golf balls for the last 3 years.

Yellow Golf Balls

Year	Number of Yellow Golf Balls Sold
1	204,132
2	225,624
3	237,108

- The company expects sales of yellow golf balls to continue to increase in year 4.
- The company also expects the ratio of yellow golf ball sales to white golf ball sales in year 4 to be about $1 : 5$.
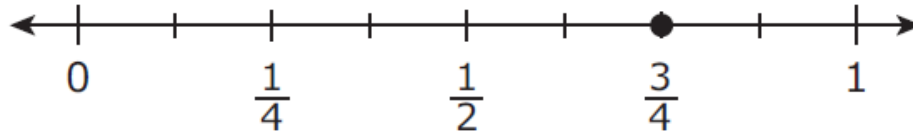- The average selling price of a box of 12 yellow or 12 white golf balls is $23.94.

Estimate the company's total sales, in dollars, of golf balls in year 4. Show all your work. Explain how you determined your estimate.

Enter your estimate, your work, and your explanation in the space provided.

13. This diagram shows a number line.

Part A

James has a board that is $\frac{3}{4}$ foot long. He wants to cut the board into pieces that are each $\frac{1}{8}$ foot long.

How many pieces can James cut from the board? Explain how James can use the number line diagram to determine the number of pieces he can cut from the board.

Enter your answer and your explanation in the space provided.

Part B

Write an equation using division that represents how James can find the number of pieces he can cut from the board.

Enter your equation in the space provided.

14. A student filled a right rectangular prism-shaped box with one inch cubes to find the volume, in cubic inches. The student's work is shown.

Box Filled with Cubes
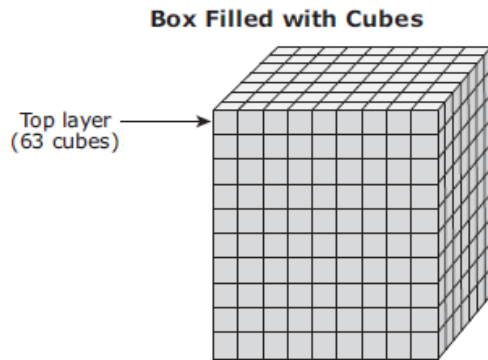
Top layer
(63 cubes) →

Student's Work
- I packed my box full of cubes. Each cube has a volume of 1 cubic inch.
- I counted 63 cubes in the top layer.
- Since there are 9 layers of cubes below the top layer, I solved 63 × 9 = 567. So there are 567 cubes.
- The volume of my box is 567 cubic inches.

Part A

Explain why the student's reasoning is incorrect. Provide the correct volume, in cubic inches, of the box.

Enter your explanation and the correct volume in the space provided.

Part B

A second box also has a base area of 63 square inches, but it has a volume of 756 cubic inches.

What is the height, in inches, of the second box? Explain or show how you determined the height.

Enter the height and your explanation or work in the space provided.

15. Part A

A group of hikers buy 8 bags of trail mix. Each bag contains $3\frac{1}{2}$ cups of trail mix. The trail mix is shared evenly among 12 hikers. How many cups of trail mix will each hiker receive? Show your work or explain your answer.

Enter your answer and your work or explanation in the space provided.

Part B

The hikers plan to visit a scenic lookout. They will rest after they hike 2 miles. Then they will hike the remaining $1\frac{3}{4}$ miles to the lookout. The trail the hikers will use to return from the lookout is $\frac{1}{2}$ mile shorter than the trail they will use to go to the lookout. Each hiker will bring $\frac{1}{4}$ gallon of water for each mile to and from the lookout.

- Determine the total distance each hiker will hike. Show your work or explain your answer.
- Determine the total number of gallons of water each hiker will bring. Show your work or explain your answer.

Enter your answers and your work or explanations in the space provided.

16. Brianna's teacher asks her which of these three expressions are equivalent to each other.

$$\text{Expression A: } 9x - 3x - 4$$
$$\text{Expression B: } 12x - 4$$
$$\text{Expression C: } 5x + x - 4$$

Brianna says that all three expressions are equivalent because the value of each one is −4 when $x = 0$.

Brianna's thinking is incorrect.

Identify the error in Brianna's thinking. Determine which of the three expressions are equivalent. Explain or show your process in determining which expressions are equivalent.

Enter your answer and your explanation or process in the space provided.

17. Sam's two new aquariums each hold exactly 200 gallons of water. One aquarium will hold small fish and the other will hold large fish. Now he needs new fish for his aquariums.

   - He will buy 5 small fish for every 10 gallons of water in the aquarium.
   - He will buy 8 large fish for every 40 gallons of water in the aquarium.

   What is the total number of fish Sam will have? What will be the ratio of Sam's small fish to large fish? Show or explain the steps you used to solve this problem.

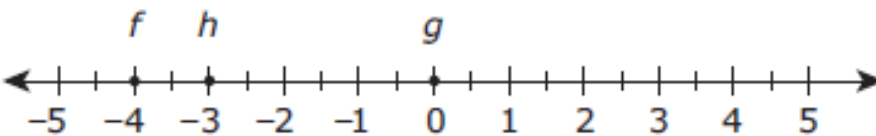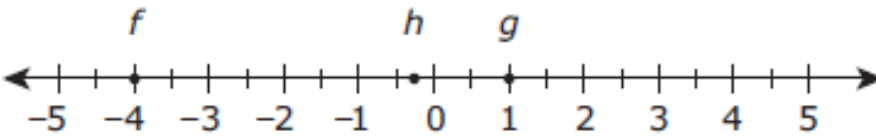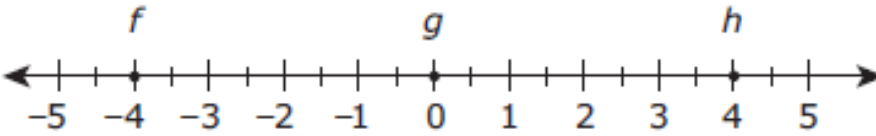   Enter your answers and your work or explanation in the space provided.

EXTRA Problems Released

6th Grade PARCC PBA Practice Assessment Item #18:

18. Three values on a number line are labeled *f*, *g*, and *h*.

$$f = -4$$
$$g = {}^-g$$
$$h = {}^-f$$

Which number line correctly shows the values of *f*, *g*, and *h*?

Ⓐ
```
        f    h              g
   ◄─┼─┼─┼─●─┼─●─┼─┼─┼─┼─●─┼─┼─┼─┼─┼─┼─┼─►
     -5  -4  -3  -2  -1   0   1   2   3   4   5
```

Ⓑ
```
        f                   h   g
   ◄─┼─┼─●─┼─┼─┼─┼─┼─┼─┼─●─┼─┼─●─┼─┼─┼─┼─►
     -5  -4  -3  -2  -1   0   1   2   3   4   5
```

Ⓒ
```
        f                g               h
   ◄─┼─┼─●─┼─┼─┼─┼─┼─┼─●─┼─┼─┼─┼─┼─●─┼─┼─►
     -5  -4  -3  -2  -1   0   1   2   3   4   5
```

Ⓓ
```
                              h
             f               │g
   ◄─┼─┼─●─┼─┼─┼─┼─┼─┼─┼─●─▼─┼─┼─┼─┼─┼─┼─►
     -5  -4  -3  -2  -1   0   1   2   3   4   5
```