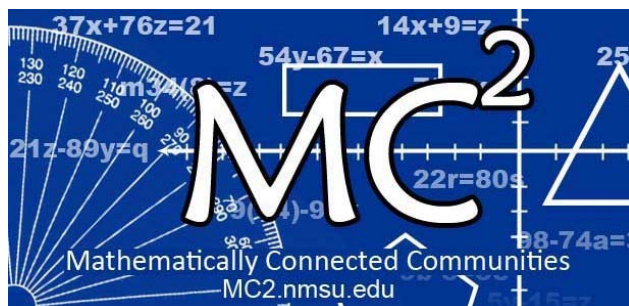


Mathematically Connected Communities



PARCC PBA Practice Test Items 8th Grade Mathematics

Excerpted 1/2015 from
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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

8th Grade PARCC PBA Practice Assessment Item #1: Standard 8.EE.1

1. Which expressions are equivalent to $\frac{1}{2^6}$?

Select **all** that apply.

Ⓐ $2^{-5} \cdot 2^{-1}$

Ⓑ $2^{-3} \cdot 2^2$

Ⓒ $2^{-2} \cdot 2^{-4}$

Ⓓ $2^1 \cdot 2^5$

Ⓔ $2^1 \cdot 2^6$

Ⓕ $2^2 \cdot 2^{-8}$

Ⓖ $2^3 \cdot 2^3$

8th Grade PARCC PBA Practice Assessment Item #2: Standard 8.EE.7.b

2. Solve this equation for x .

$$0.5(5 - 7x) = 8 - (4x + 6)$$

8th Grade PARCC PBA Practice Assessment Item #3: Standard 8.F.1-1

3. A partially filled input-output table is shown. Complete the table so that it represents a function.

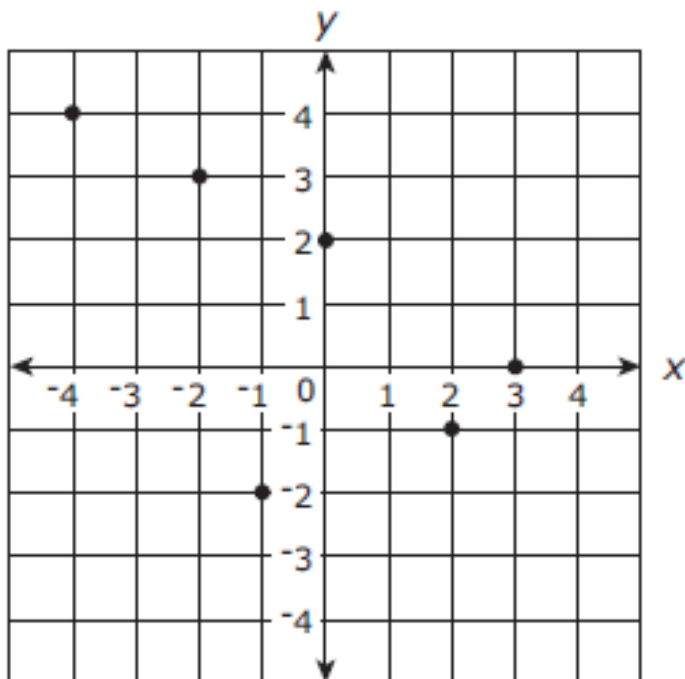
Drag and drop each number from the list into the correct Input or Output box.

1 5 8 10

Input	Output
1	4
<input type="text"/>	6
5	<input type="text"/>
<input type="text"/>	<input type="text"/>

8th Grade PARCC PBA Practice Assessment Item #4: Standard 8.F.1-2

4. The graph represents y as a function of x .

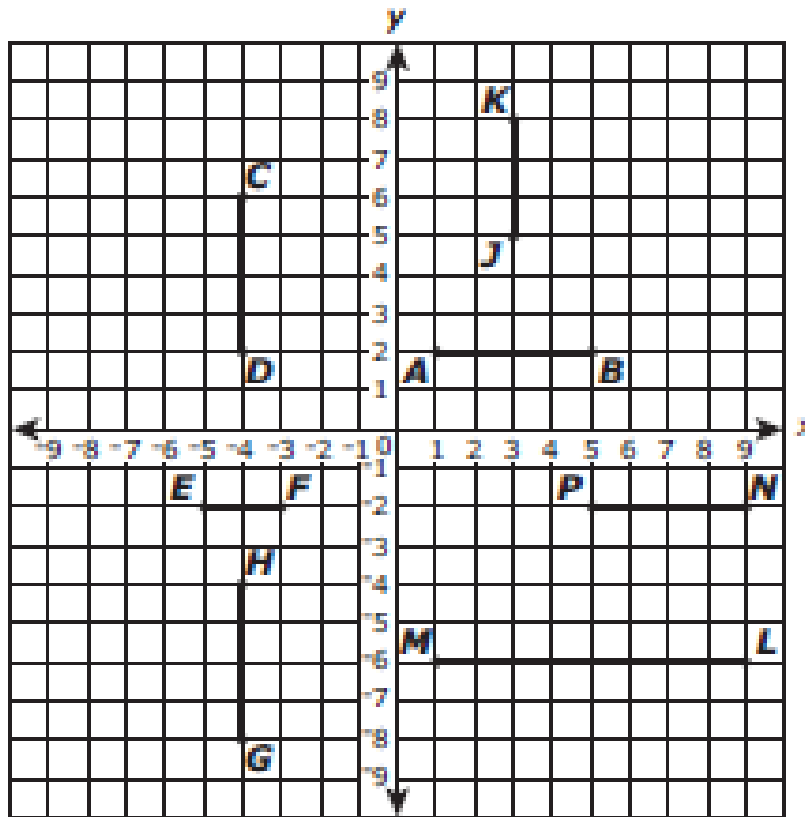


Which additional point can be plotted so that the graph continues to represent y as a function of x ?

- Ⓐ (0, 1)
- Ⓑ (2, 2)
- Ⓒ (3, 4)
- Ⓓ (4, 2)

8th Grade PARCC PBA Practice Assessment Item #5: Standard 8.G.1a

5.



Seven line segments are shown on the coordinate plane.

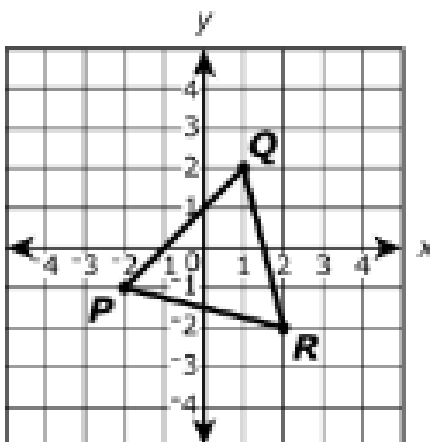
Which of these segments could be the image of segment AB after a sequence of reflections, rotations, and/or translations?

Select **each** correct answer.

- Ⓐ line segment CD
- Ⓑ line segment EF
- Ⓒ line segment GH
- Ⓓ line segment JK
- Ⓔ line segment LM
- Ⓕ line segment NP

8th Grade PARCC PBA Practice Assessment Item #6: Standard 8.G.3

6. Triangle PQR is shown on the coordinate plane.



Triangle PQR is rotated 90° counterclockwise about the origin to form the image triangle $P'Q'R'$ (not shown). Then triangle $P'Q'R'$ is reflected across the x -axis to form triangle $P''Q''R''$ (not shown).

Part A

What are the signs of the coordinates (x, y) of point P' ?

- A. Both x and y are positive.
- B. x is negative and y is positive.
- C. Both x and y are negative.
- D. x is positive and y is negative.

Part B

What are the signs of the coordinates (x, y) of point Q'' ?

- A. Both x and y are positive.
- B. x is negative and y is positive.
- C. Both x and y are negative.
- D. x is positive and y is negative.

8th Grade PARCC PBA Practice Assessment Item #7: Standard 8.G.1c

7. Lines m and n are parallel on a coordinate plane. Lines m and n are transformed by the same rotation, resulting in image lines s and t . Which statement describes the relationship between lines s and t ?
- Ⓐ Lines s and t are parallel.
 - Ⓑ Lines s and t are perpendicular.
 - Ⓒ Lines s and t are intersecting but not perpendicular.
 - Ⓓ The relationship between lines s and t cannot be determined without knowing the angle of the rotation.

8th Grade PARCC PBA Practice Assessment Item #8: Standard 8.EE.4-1

8. One type of ant weighs about 3×10^{-3} gram. The ant can carry close to 1.5×10^{-1} gram of food on its back. The amount of food, in grams, an ant can carry on its back is approximately how many times its own body weight, in grams? Give your answer in standard form.

8th Grade PARCC PBA Practice Assessment Item #9: Standard 8.EE.8a

9. Consider the system of equations.

$$\begin{cases} y = 2x + 2 \\ y = 6x + 2 \end{cases}$$

Which statements are true about the system of equations?

Select **each** correct answer.

- Ⓐ The graph of the system consists of lines that have no points of intersection.
- Ⓑ The graph of the system consists of lines that have exactly one point of intersection.
- Ⓒ The graph of the system consists of lines that have more than one point of intersection.
- Ⓓ The system has no solution.
- Ⓔ The system has exactly one solution.
- Ⓕ The system has more than one solution.



8th Grade PARCC PBA Practice Assessment Item #10: Standard 8.EE.4-2

10. The average distance from Earth to the Moon is approximately 384,400,000 meters. What is the average distance, in kilometers, from Earth to the Moon written in scientific notation?

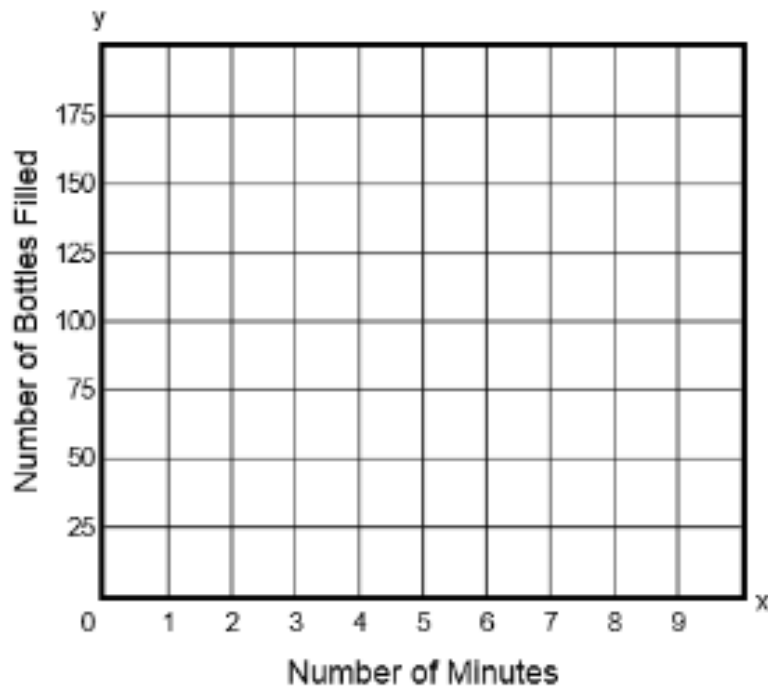
- Ⓐ 3.844×10^4 kilometers
- Ⓑ 3.844×10^5 kilometers
- Ⓒ 3.844×10^7 kilometers
- Ⓓ 3.844×10^8 kilometers



8th Grade PARCC PBA Practice Assessment Item #11: Standard 8.EE.5-2

- 11.** The number of bottles a machine fills is proportional to the number of minutes the machine operates. The machine fills 250 bottles every 20 minutes. Create a graph that shows the number of bottles, y , the machine fills in x minutes.

To graph a line, select two points on the coordinate plane. A line will be drawn through the points.





8th Grade PARCC PBA Practice Assessment Item #12: Standard 8.C.1.2

In a system of two linear equations, the lines represented by each equation have the same slope.

12. Part A

Which could be the total number of solutions to the system of equations?

Select **each** correct answer.

- Ⓐ no solutions
- Ⓑ 1 solution
- Ⓒ 2 solutions
- Ⓓ 3 solutions
- Ⓔ infinitely many solutions

Part B

Explain why you chose your answer(s) in Part A.

Enter your explanation for each selection in the space provided.



8th Grade PARCC PBA Practice Assessment Item #13: Standard 8.D.1

13. Two utility companies sell electricity in units of kilowatt-hours. The cost of electricity for company P is shown in the table. The cost of electricity for company M can be found by using the equation shown, where y represents the total cost in dollars for x kilowatt-hours of electricity.

Company P		Company M
Number of Kilowatt-hours	Total Cost (dollars)	$y = 0.15x$
1,250	150.00	
1,650	198.00	

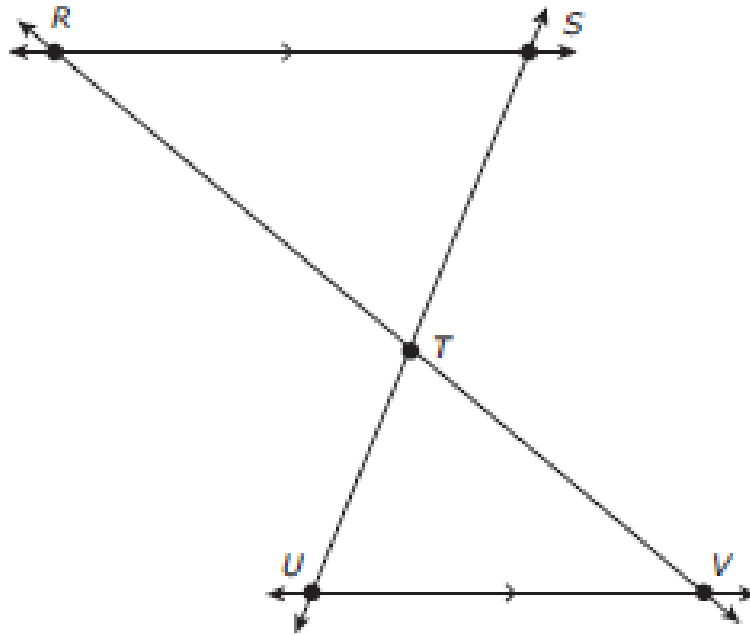
- Use the information provided to find the unit rate, in dollars per kilowatt-hour, for each company. Show your work or explain your answers.
- Find the total cost, in dollars, of buying 2,375 kilowatt-hours of electricity from the **least** expensive company.

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



8th Grade PARCC PBA Practice Assessment Item #14: Standard 8.C.3.3

14. The figure shows line RS parallel to line UV . The lines are intersected by 2 transversals. All lines are in the same plane.



Part A

Explain why triangle RTS is similar to triangle VTU .

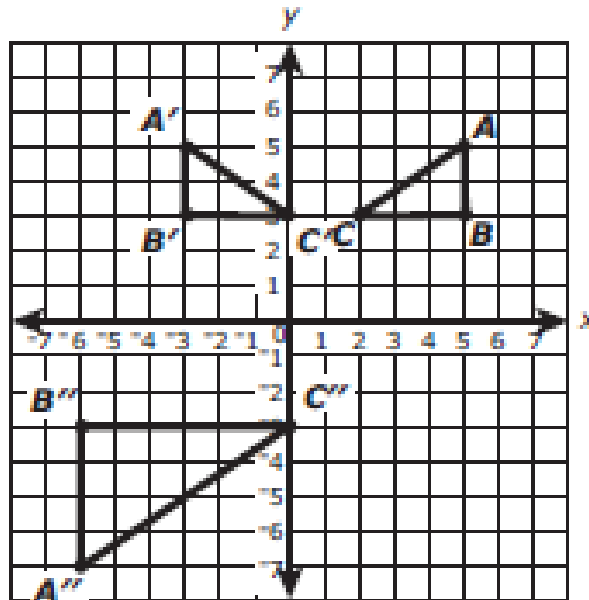
Part B

Given that $m\angle STV = 108^\circ$, determine $m\angle SRT + m\angle TUV$. Show your work or explain your answer.



8th Grade PARCC PBA Practice Assessment Item #15: Standard 8.C.5.2

15. In the coordinate plane shown, triangle ABC is congruent to triangle $A'B'C'$.
Triangle $A'B'C'$ is similar to triangle $A''B''C''$.



Part A

Describe a single transformation that shows that triangle $A'B'C'$ is congruent to triangle ABC . Include all the necessary information to complete the transformation.



8th Grade PARCC PBA Practice Assessment Item #15: Standard 8.C.5.2

15. (continued):

Part B

Describe a sequence of transformations that shows that triangle $A''B''C''$ is similar to triangle $A'B'C'$. Include all the necessary information to complete each transformation.



8th Grade PARCC PBA Practice Assessment Item #16: Standard 8.D.2

16. The owner of a computer store is offering a discount on a computer sold in the store.

Computer Sale!

Original Price: \$598.00
25% off original price

8% tax applied after discount

Part A

The owner offers a payment plan where the total cost of the computer is paid in 6 equal monthly payments.

- Determine the amount of each monthly payment.
- Show your work or explain your answer.

Enter the monthly payment and your work or explanation in the space provided.



8th Grade PARCC PBA Practice Assessment Item #16: Standard 8.D.2

16. (continued)

Part B

A different computer is advertised as 40% off of the original price. After the discount, the tax is \$44.64.

- Determine the total price of this computer after the discount and tax are applied.
- Show your work or explain your answer.
- Determine the original price of this computer.
- Show your work or explain your answer.

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



8th Grade PARCC PBA Practice Assessment Item #17: Standard 8.C.6

Martin is considering the expressions $\frac{1}{2}(7x + 48)$ and $-\left(\frac{1}{2}x - 3\right) + 4(x + 5)$. He wants to know if one expression is greater than the other for all values of x .

17. Part A

Which statement about the relationship between the expressions is true?

- Ⓐ The value of the expression $\frac{1}{2}(7x + 48)$ is always equal to the value of the expression $-\left(\frac{1}{2}x - 3\right) + 4(x + 5)$.
- Ⓑ The value of the expression $\frac{1}{2}(7x + 48)$ is always less than the value of the expression $-\left(\frac{1}{2}x - 3\right) + 4(x + 5)$.
- Ⓒ The value of the expression $\frac{1}{2}(7x + 48)$ is always greater than the value of the expression $-\left(\frac{1}{2}x - 3\right) + 4(x + 5)$.
- Ⓓ The value of the expression $\frac{1}{2}(7x + 48)$ is sometimes greater than and sometimes less than the value of the expression $-\left(\frac{1}{2}x - 3\right) + 4(x + 5)$.



8th Grade PARCC PBA Practice Assessment Item #17: Standard 8.C.6

17. (continued)

Part B

Show or explain how you found your answer to Part A.

Enter your work or your explanation in the space provided.

Part C

Write a new expression that always has a greater value than both of these expressions.

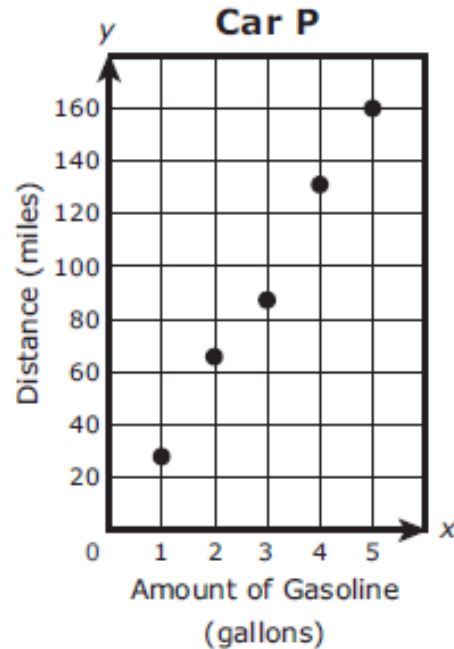
Enter your expression in the space provided.



8th Grade PARCC PBA Practice Assessment Item #18: Standard 8.D.3

18. The gasoline mileage for two cars can be compared by finding the distance each car traveled and the amount of gasoline used. The table shows the distance that car M traveled using x gallons of gasoline. The graph shows the distance, y , that car P traveled using x gallons of gasoline.

Amount of Gasoline (gallons)	Distance (miles)
2	50.4
3	80.5
7	181.3
5	137.5



Based on the information in the table and the graph, compare the approximate miles per gallon of car M to car P. Show your work or explain your answers.

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

Extra items released

8th Grade PARCC PBA Practice Assessment Item #19:

19. Which of these equations represent functions where x is the input and y is the output?

Select **each** correct answer.

Ⓐ $x = 2$

Ⓑ $y = 2$

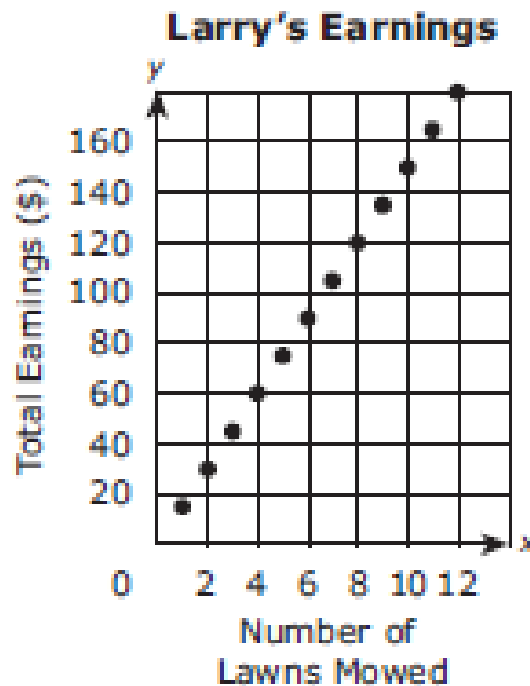
Ⓒ $y = 2x$

Ⓓ $x = 2y$

Ⓔ $x + y = 2$

8th Grade PARCC PBA Practice Assessment Item #20:

20. Larry and Mark each mow lawns in their neighborhoods. Information about each person's earnings is shown.



Mark's Earnings

- Mark earns \$60 for mowing 3 lawns.
- Mark earns \$300 for mowing 15 lawns.

For both Larry and Mark, the number of dollars earned is proportional to the number of lawns mowed.

Which statement correctly compares the amount of money Larry and Mark each earn per lawn?

- Ⓐ Larry earns \$2 more than Mark earns per lawn.
- Ⓑ Larry earns \$5 less than Mark earns per lawn.
- Ⓒ Larry earns \$10 more than Mark earns per lawn.
- Ⓓ Larry earns \$15 less than Mark earns per lawn.