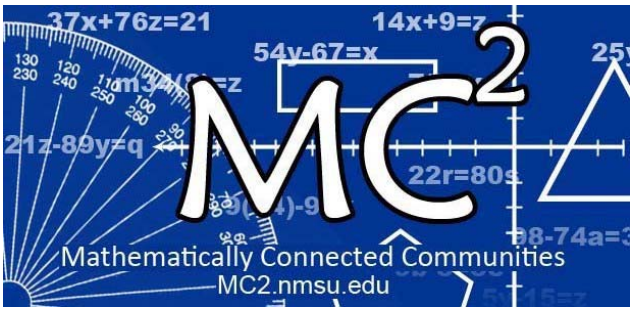
Mathematically Connected Communities



PARCC PBA Practice Test Items
7th Grade Mathematics

Excerpted 1/2015 from
PARCC Online Practice Tests
www.parcconline.org

Mathematical Practice Questions for MC^2 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 MC^2 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.

7th Grade PARCC PBA Practice Assessment Item #1: Standard 7.RP.2b

1. Which equation has a constant of proportionality equal to 4?

Ⓐ $4y = 4x$

Ⓑ $4y = 12x$

Ⓒ $3y = 4x$

Ⓓ $3y = 12x$

7th Grade PARCC PBA Practice Assessment Item #2: Standard 7.NS.2c

2. The amount of money Jamie earns is proportional to the number of hours she works. Jamie earns $62.50 working 5 hours.

Create an equation that models the relationship between *m*, the amount of money Jamie earns, in dollars, and *h*, the number of hours she works.

Drag and drop the appropriate number and variables into each box.

12.05	12.50	57.50	67.50	m	h

[ ] = [ ] • [ ]

7th Grade PARCC PBA Practice Assessment Item #3: Standard 7.NS.3

3. An airplane's altitude changed −378 feet over 7 minutes. What was the mean change of altitude in feet per minute?

7th Grade PARCC PBA Practice Assessment Item #4: Standard 7.EE.1

4. Which expression is equivalent to $\frac{1}{4}(8 - 6x + 12)$?

Ⓐ $\frac{7}{2}x$

Ⓑ $-\frac{13}{2}x$

Ⓒ $-6x + 14$

Ⓓ $-\frac{3}{2}x + 5$

7th Grade PARCC PBA Practice Assessment Item #5: Standard 7.RP.2c

5. The numbers of parts produced by three different machines are shown in the table.

Numbers of Machine Parts

Minutes	Machine Q	Machine R	Machine S
1	9	8	6
3	18	24	18
9	72	72	52

Only one of the machines produces parts at a constant rate. Write an equation that can be used to represent y, the number of parts produced in x minutes, for that machine.

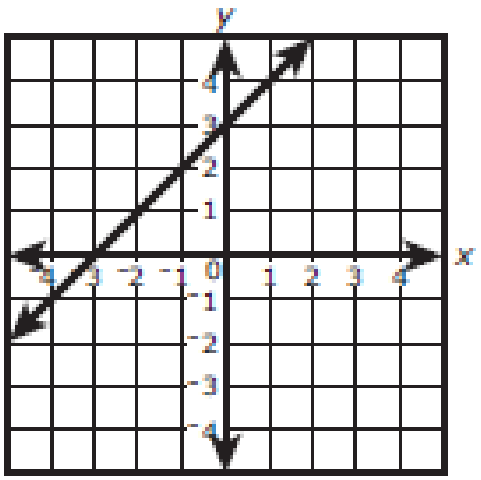
Enter your equation in the space provided. Enter **only** your equation.

7th Grade PARCC PBA Practice Assessment Item #6: Standard 7.RP.2b

6. Which relationships have the same constant of proportionality between y and x as in the equation $y = \frac{1}{3}x$?

Select **each** correct answer.

Ⓐ



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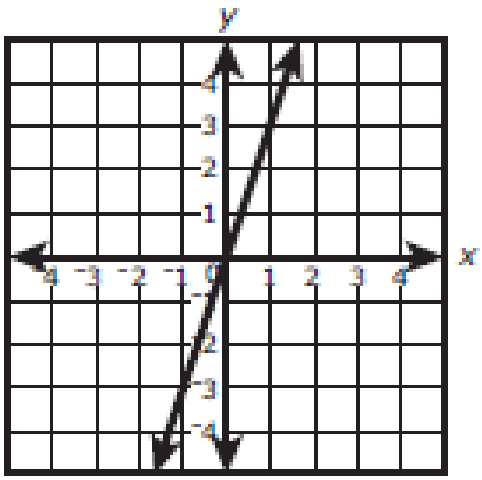

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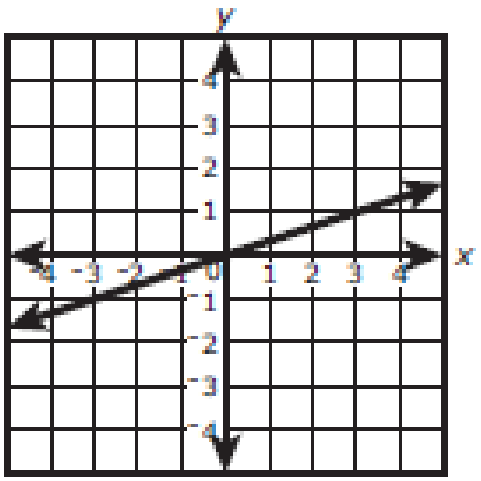


Ⓓ

x	−1.5	0	1.6	9.7
y	−4.5	0	4.8	29.1

Ⓔ

x	−5.4	−2.7	1.5	2.4
y	−1.8	−0.9	0.5	0.8

7th Grade PARCC PBA Practice Assessment Item #7: Standard 7.RP.1

7. A $4\frac{1}{2}$ -ounce hamburger patty has $25\frac{1}{2}$ grams of protein, and 6 ounces of fish has 32 grams of protein. Determine the grams of protein per ounce for each type of food.

Select from the drop-down menus to correctly complete each statement.

A hamburger patty has approximately Choose... grams of protein per ounce.

- Choose...
- 0.2
- 4.5
- 5.7
- 21.0
- 25.5

The fish has approximately Choose... grams of protein per ounce.

- Choose...
- 0.2
- 5.3
- 6.0
- 26.0
- 32.0

7th Grade PARCC PBA Practice Assessment Item #8: Standard 7.RP.2a

8. A right triangle has legs measuring 4.5 meters and 1.5 meters.

The lengths of the legs of a second triangle are proportional to the lengths of the legs of the first triangle.

Which could be the lengths of the legs of the second triangle?

Select **each** correct pair of lengths.

Ⓐ 6 m and 2 m

Ⓑ 8 m and 5 m

Ⓒ 7 m and 3.5 m

Ⓓ 10 m and 2.5 m

Ⓔ 11.25 m and 3.75 m

7th Grade PARCC PBA Practice Assessment Item #9: Standard 7.EE.4a-1

Rebecca and Megan are shopping at a store that sells jewelry, scarves, and purses. The cost of all the items at the store include tax.

9. Part A

Rebecca buys some scarves that cost $5 each and 2 purses that cost $12 each. The cost of Rebecca's total purchase is $39. What equation can be used to find n, the number of scarves that Rebecca buys?

Ⓐ $5 + 24n = 39$

Ⓑ $5n + 24 = 39$

Ⓒ $(24 + 5)n = 39$

Ⓓ $24 \cdot 5 + n = 39$

Part B

Megan buys 3 bracelets and 3 necklaces. Each bracelet costs $5. Megan pays the clerk $40 and gets $4 change. What is the cost, in dollars, of one necklace?

7th Grade PARCC PBA Practice Assessment Item #10: Standard 7.EE.3

10. A teacher surveyed students in four classes to determine the location for a field trip. Each student chose only one location. The table shows the number of students from each class who chose each location.

Field Trip Choices

Class	Number of Students Who Chose the Zoo	Number of Students Who Chose the Museum	Number of Students Who Chose the Planetarium
Class E	10	9	8
Class F	8	11	11
Class G	12	8	5
Class H	6	10	8

Part A

Determine the percent of students in each class who chose the museum. What is the order, from **least** to **greatest**,of the percents for each class?

Ⓐ Class E, Class F, Class G, Class H

Ⓑ Class G, Class E, Class F, Class H

Ⓒ Class G, Class E, Class H, Class F

Ⓓ Class H, Class F, Class E, Class G

Part B

The total number of students who chose the zoo is how many times as great as the total number of students who chose the planetarium?

Ⓐ 1

Ⓑ $1\frac{1}{18}$

Ⓒ $1\frac{1}{8}$

Ⓓ $1\frac{1}{9}$

7th Grade PARCC PBA Practice Assessment Item #11: Standard 7.C.7.3

11. Chris made at least one error as she found the value of this expression.

$$2(-20) + 3\left[\frac{5}{4}(-20)\right] + 5\left[\frac{2}{5}(50)\right] + 4(50)$$

Step 1: $2(-20) + 3(-25) + 5(20) + 4(50)$

Step 2: $(3 + 2)(-20 + -25) + (5 + 4)(20 + 50)$

Step 3: $5(-45) + 9(70)$

Step 4: $-225 + 630$

Step 5: 405

Identify the step in which Chris made her first error. After identifying the step with the first error, write the corrected steps and find the final answer.

Enter the identified step, your work, and the final answer in the space provided.

7th Grade PARCC PBA Practice Assessment Item #12: Standard 7.C.8

12. Consider the inequality $5x < 30$.

Part A

Natalia says that any value of x less than 25 makes the inequality true.

- Use a specific example to disprove Natalia's statement.
- Explain why your example disproves her statement.

Enter your example and your explanation in the space provided.

Part B

Describe in words all values of x that make the inequality true. Explain your answer.

Enter your description and your explanation in the space provided.

7th Grade PARCC PBA Practice Assessment Item #13: Standard 7.D.3

13. A scientist planted seeds in 4 sections of soil for an experiment. Not all of the seeds grew into plants. After 20 days, the scientist counted the number of plants in each of the 4 sections. The results are shown in the table.

Plant Experiment

Section	Size of Section (square feet)	Number of Plants
1	25	13
2	100	38
3	125	47
4	150	62

- Use the data in the table to determine approximately how many plants grew per square foot.
- Explain or show how you determined your approximation.
- Let y be the number of plants expected to grow in x square feet. Write an equation the scientist could use to model the relationship between y and x.

Enter your approximation, explanation, and equation in the space provided.

7th Grade PARCC PBA Practice Assessment Item #14: Standard 7.C.2

14. Consider the equation $5 + x = n$.

What must be true about any value of x if n is a negative number? Explain your answer. Include an example with numbers to support your explanation.

Enter your answer, your explanation, and your example in the space provided.

7th Grade PARCC PBA Practice Assessment Item #15: Standard 7.D.2

15. A worker has to drive her car as part of her job. She receives money from her company to pay for the gas she uses. The table shows a proportional relationship between y, the amount of money that the worker receives, and x, the number of work-related miles driven.

Mileage Rates

Distance Driven, x (miles)	Amount of Money Received, y (dollars)
25	12.75
35	17.85
40	20.40
50	25.50

Part A

Explain how to compute the amount of money the worker receives for any number of work-related miles. Based on your explanation, write an equation that can be used to determine the total amount of money, y, the worker receives for driving x work-related miles.

Enter your explanation and your equation in the space provided.

15. (continued)

Part B

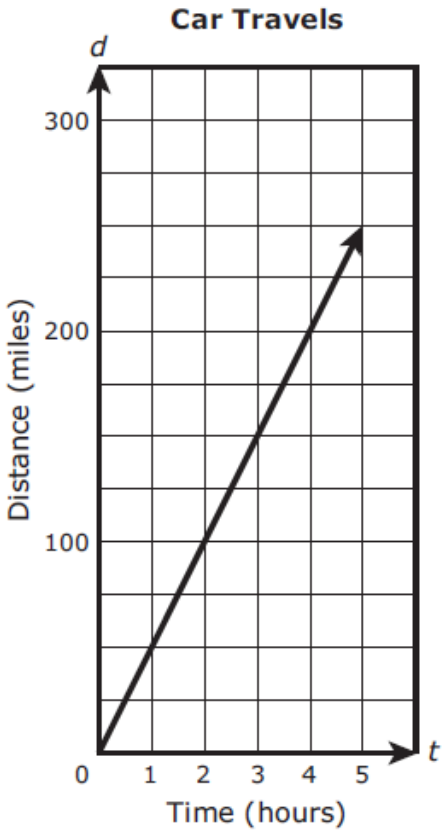
On Monday, the worker drove a total of 134 work-related and personal miles. She received $32.13 for the work-related miles she drove on Monday. What percent of her total miles driven were work-related on Monday? Show or explain your work.

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

7th Grade PARCC PBA Practice Assessment Item #16: Standard 7.C.4

16. **Part A**

The graph shows the distance in miles, *d*, a car travels in *t* hours.



Explain why the graph does or does not represent a proportional relationship between the variables *d* and *t*.

Enter your explanation in the space provided.

7th Grade PARCC PBA Practice Assessment Item #16: Standard 7.D.2

16. (continued)

Part B

Two cars leave from the same city at the same time and drive in the same direction. The table shows the distances traveled by each car.

Two Cars Travel

Hours of Travel	Miles Traveled by Red Car	Miles Traveled by White Car
1	77	55
2	122	110
3	167	165
4	212	220
5	257	275

- Determine whether the relationship between the number of hours traveled and the number of miles traveled is proportional for each car.
- Use the table to explain how you determined your answers.
- Describe how the graph of the distance traveled by each car would support your answers.

Enter your answers and your explanations in the space provided.

7th Grade PARCC PBA Practice Assessment Item #17: Standard 7.D.1

17. Sal exercised by stretching and jogging 5 days last week.

- He stretched for a total of 25 minutes during the **week**.
- He jogged for an equal number of minutes each of the 5 days.
- He exercised for a total of 240 minutes.

Elena also exercised by stretching and jogging 5 days last week.

- She stretched for 15 minutes each **day**.
- She jogged for an equal number of minutes each of the 5 days.
- She exercised for a total of 300 minutes.

Determine the number of minutes Sal jogged each day last week and the number of minutes Elena jogged each day last week. Show your work or explain all the steps you used to determine your answers.

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

Extra Released Problems

7th Grade PARCC PBA Practice Assessment Item #18:

18. The numbers of parts produced by three different machines are shown in the table.

Numbers of Machine Parts

Minutes	Machine Q	Machine R	Machine S
1	9	8	6
3	18	24	18
9	27	72	52

Only one of the machines produces parts at a constant rate. Which equation represents y, the number of parts produced in x minutes, for the one machine that produces parts at a constant rate?

Ⓐ $y = 3x$

Ⓑ $y = 6x$

Ⓒ $y = 8x$

Ⓓ $y = 9x$

7th Grade PARCC PBA Practice Assessment Item #19:

19. A machine packs boxes at a constant rate of $\frac{2}{3}$ of a box every $\frac{1}{2}$ minute. What is the number of boxes per minute that the machine packs?

Ⓐ $\frac{1}{3}$

Ⓑ $\frac{3}{4}$

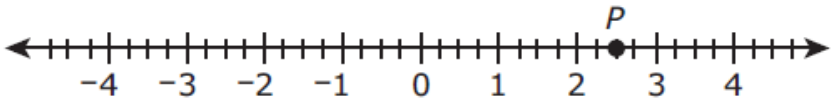
Ⓒ $1\frac{1}{6}$

Ⓓ $1\frac{1}{3}$

7th Grade PARCC PBA Practice Assessment Item #20:

20. Use the information provided to answer Part A and Part B.

Point *P* is plotted on the number line.



Part A

Point *Q* is the opposite of point *P*. Determine the location of point *Q* on the number line. Explain how you determined the location of point *Q* on the number line.

Part B

Point *S* is located at $\frac{5}{4}$ on the number line. A student claims that the location of point *S* is to the right of the location of point *P* on the number line.

- Explain whether the student's claim is correct or incorrect.
- Write an inequality that describes the relationship between the value of point *P* and the value of point *S*.