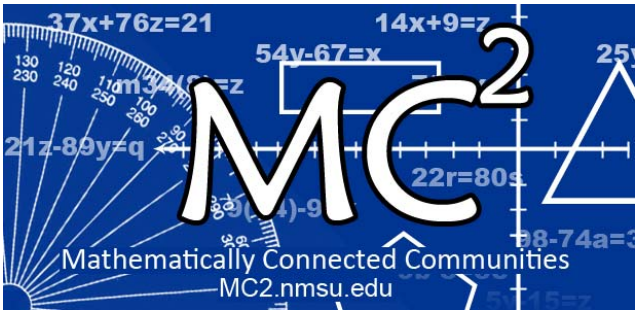
Mathematically
Connected Communities



PARCC EOY Practice Test Items
8th Grade Mathematics

Excerpted 11/2014 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.

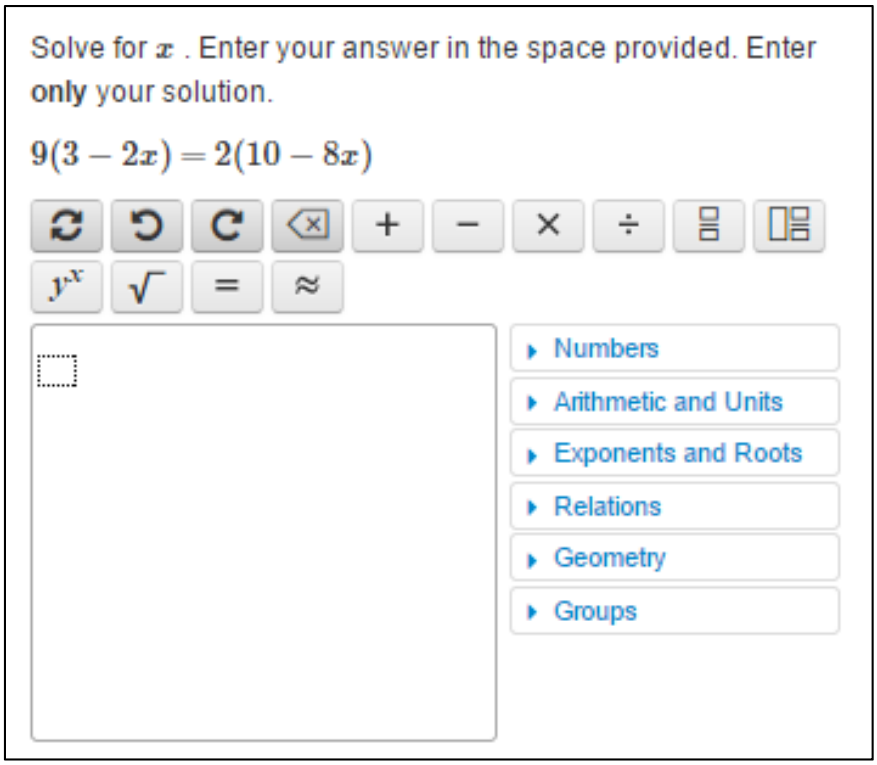
Math Practice 4: **Model with mathematics.**

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?
3. Use appropriate and precise mathematical language, units, labels and computations to clearly describe your mathematical reasoning.

8th Grade PARCC EOY Practice Assessment Item #1: Standard 8.EE.7b



8th Grade PARCC EOY Practice Assessment Item #2: Standard 8.NS.1

Which decimal is equivalent to $\frac{6}{11}$?

Select your answer.

- A. $0.18\overline{3}$
- B. $0.1\overline{83}$
- C. $0.5\overline{4}$
- D. $0.\overline{54}$

8th Grade PARCC EOY Practice Assessment Item #3: Standard 8.EE.8a

Two lines are graphed on the same coordinate plane. The lines only intersect at the point $(3, 6)$. Which of these systems of linear equations could represent the two lines?

Select **all** that apply.

- A. $\begin{cases} x = 3 \\ y = 6 \end{cases}$
- B. $\begin{cases} x = 6 + y \\ y = 3 + x \end{cases}$
- C. $\begin{cases} y = 3x - 3 \\ y = x - 1 \end{cases}$
- D. $\begin{cases} x = 3 + y \\ y = 6 + x \end{cases}$
- E. $\begin{cases} y = x + 3 \\ y = 2x \end{cases}$

8th Grade PARCC EOY Practice Assessment Item #4: Standard 8.F.3-1

A relationship between x and y is defined by the equation $y = -\frac{4}{3}x + \frac{1}{3}$, where x is the input and y is the output.
Which statements about the relationship are true?

Select **each** correct statement.

- ☐ A. y is a function of x.
- ☐ B. The graph of the relationship is a line.
- ☐ C. When the input is -3, the output is 4.
- ☐ D. When the input is -2, the output is 3.
- ☐ E. The y -intercept of the relationship is (0,1).

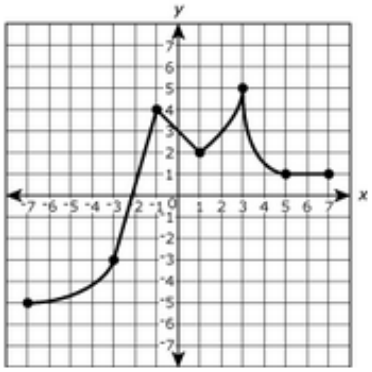
8th Grade PARCC EOY Practice Assessment Item #5: Standard 8.EE.3

The body of a 154-pound person contains approximately 2×10^{-1} milligrams of gold and 6×10^{1} milligrams of aluminum. Based on this information, the number of milligrams of aluminum in the body is how many times the number of milligrams of gold in the body?

Enter your answer in the box.

8th Grade PARCC EOY Practice Assessment Item #6: Standard 8.F.5-1

The graph shows y as a function of x.



For each interval in the table, indicate whether the function is increasing, decreasing, or neither increasing nor decreasing over the interval.

Interval	Increasing	Decreasing	Neither Increasing nor Decreasing
$-7 < x < -3$	☐	☐	☐
$-3 < x < -1$	☐	☐	☐
$-1 < x < 1$	☐	☐	☐
$1 < x < 3$	☐	☐	☐
$3 < x < 5$	☐	☐	☐
$5 < x < 7$	☐	☐	☐

8th Grade PARCC EOY Practice Assessment Item #7: Standard 8.EE.8b-3

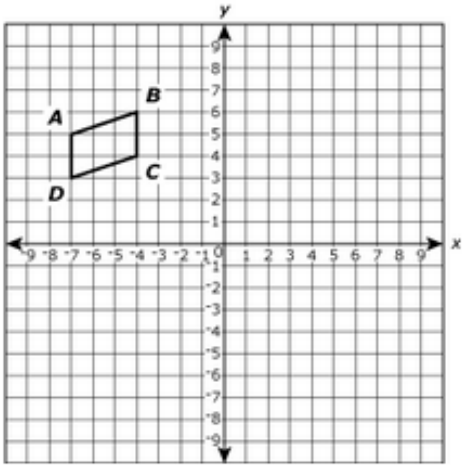
The table shows two systems of linear equations.

Indicate whether each system of equations has no solution, one solution, or infinitely many solutions by selecting the correct cell in the table. Select one cell per column.

System of Equations	$\begin{cases} y = -x \\ 8y = -8x \end{cases}$	$\begin{cases} y = (3x + 1) \\ y = -4 \end{cases}$
No Solution	☐	☐
One Solution	☐	☐
Infinitely Many Solutions	☐	☐

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

Parallelogram $ABCD$ is shown on the coordinate plane.



Parallelogram $A'B'C'D'$ (not shown) is the image of parallelogram $ABCD$ after a rotation of 180° about the origin.

Which statements about parallelogram $A'B'C'D'$ are true?

Select **each** correct statement.

- A. $\overline{A'B'}$ is parallel to $\overline{B'C'}$.
- B. $\overline{A'B'}$ is parallel to $\overline{A'D'}$.
- C. $\overline{A'B'}$ is parallel to $\overline{C'D'}$.
- D. $\overline{A'D'}$ is parallel to $\overline{B'C'}$.
- E. $\overline{A'D'}$ is parallel to $\overline{D'C'}$.

8th Grade PARCC EOY Practice Assessment Item #9: Standard 8.EE.2

Which equation has **both** 4 and -4 as possible values of y?

A. $y^2 = 8$

B. $y^3 = 8$

C. $y^2 = 16$

D. $y^3 = 64$

8th Grade PARCC EOY Practice Assessment Item #10: Standard 8.F.1-1

When the input to a function is -2, the output is 4.

Which statement about this function **must** be true?

- A. An input of -2 has infinitely many possible outputs.
- B. An input of -2 has exactly one possible output.
- C. An output of 4 has infinitely many inputs.
- D. An output of 4 has exactly one input.

8th Grade PARCC EOY Practice Assessment Item #11: Standard 8.EE.8b-1

A system of equations is shown.

$$\begin{cases} x = 10 \\ 3x + 5y = 20 \end{cases}$$

What is the solution (x, y) of the system of equations?

Enter your answers in the boxes.

(,)

8th Grade PARCC EOY Practice Assessment Item #13: Standard 8.EE.1

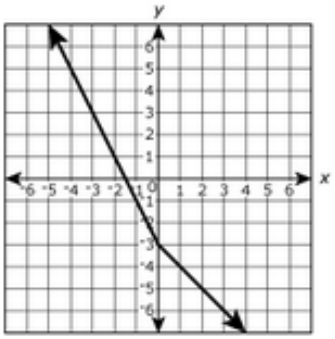
Which expressions are equivalent to $\frac{3^{-8}}{3^{-4}}$?

Select **all** that apply.

- [ ] A. 3^{-12}
- [ ] B. 3^{-4}
- [ ] C. 3^{2}
- [ ] D. $\frac{1}{3^{2}}$
- [ ] E. $\frac{1}{3^{4}}$
- [ ] F. $\frac{1}{3^{12}}$

8th Grade PARCC EOY Sample Assessment Item #14: Standard 8.F.1-2

The graph of a nonlinear function is shown on the coordinate plane. In the graph, *y* is a function of *x*.



When the input of the function is -4, what is the output of the function?

A. -5

B. -1

C. 1

D. 5

8th Grade PARCC EOY Sample Assessment Item #17: Standard 8.F.3-2

Classify each equation as defining y as a linear or non-linear function of x. Select one cell per column.

function	$y = 7 \times 4x$	$y = (2x + 5)^2$	$y = 10x^2$	$y = 5x - 3$	$y = \frac{x}{2}$	$y = 2x^3 + 1$
linear	○	○	○	○	○	○
non-linear	○	○	○	○	○	○

8th Grade PARCC EOY Sample Assessment Item #18: Standard 8.EE.7b

Solve for x.

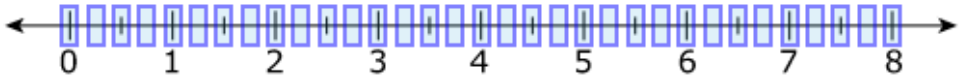
$$\frac{1}{5}\left(2x-10\right)+4x=-3\left(\frac{1}{5}x+4\right)$$

Enter your answer in the space provided. Enter **only** your solution.

- Numbers
- Arithmetic and Units
- Exponents and Roots
- Relations
- Geometry
- Groups

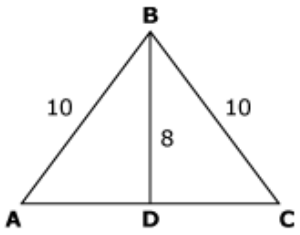
8th Grade PARCC EOY Sample Assessment Item #19: Standard 8.NS.2

Select the point on the number line that **best** approximates the location of $\sqrt{14}$.



8th Grade PARCC EOY Practice Assessment Item #1 (Part 2: Calculator): Standard 8.G.7-1

In $\triangle ABC$, $\overline{BD}$ is perpendicular to $\overline{AC}$. The dimensions are shown in centimeters.



What is the length of $\overline{AC}$?

Enter your answer in the box.

centimeters

8th Grade PARCC EOY Practice Assessment Item #2 (Part 2: Calculator): Standard 8.EE.C.Int.1

Filipo is building a rectangular sandbox for his younger brother. The length of the sandbox is 1 foot longer than twice the width of the sandbox. The perimeter of the sandbox is 29 feet.

Part A

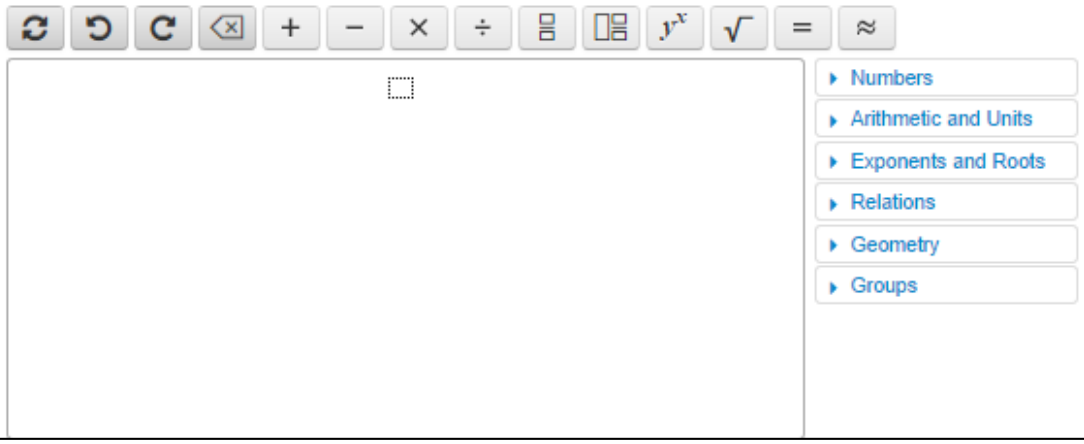
Which equation could be used to determine *w*, the width, in feet, of the sandbox?

- A. $w + w + 2 = 29$
- B. $w + 2w + 1 = 29$
- C. $2w + 2(w + 2) = 29$
- D. $2w + 2(2w + 1) = 29$

Part B

What is the width, in feet, of the sandbox?

Enter your answer in the space provided.



8th Grade PARCC EOY Practice Assessment Item #3 (Part 2: Calculator): Standard 8.SP.4

The table shows the results of a random survey of students in grade 7 and grade 8. Every student surveyed gave a response. Each student was asked if he or she exercised less than 5 hours last week or 5 or more hours last week.

	Less than 5 hours	5 or more hours
Grade 7 Students	49	63
Grade 8 Students	58	51

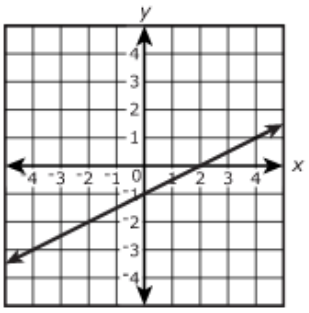
Based on the results of the survey, which statements are true? Select **each** correct statement.

- A. More grade 8 students were surveyed than grade 7 students.
- B. A total of 221 students were surveyed.
- C. Less than 50% of the grade 8 students surveyed exercised 5 or more hours last week.
- D. More than 50% of the students surveyed exercised less than 5 hours last week.
- E. A total of 107 grade 7 students were surveyed.

8th Grade PARCC EOY Practice Assessment Item #5 (Part 2: Calculator): Standard 8.F.2

Functions W and Z are both linear functions of x.

Function W



Function Z

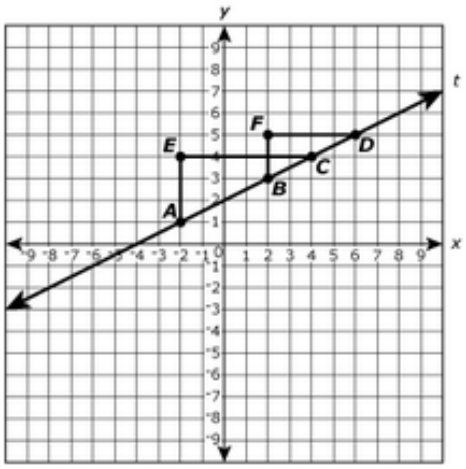
x	y
−2	−2.5
0	−2
2	−1.5
4	−1

Which statement comparing the functions is true?

- A. The slope of Function W is less than the slope of Function Z.
- B. The slope of Function W is greater than the slope of Function Z.
- C. The y-intercept of Function W is equal to the y-intercept of Function Z.
- D. The y-intercept of Function W is less than the y-intercept of Function Z.
- E. The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.
- F. The y-value when $x = -4$ for Function W is equal to the y-value when $x = -4$ for Function Z.

8th Grade PARCC EOY Practice Assessment Item #6 (Part 2: Calculator): Standard 8.EE.5-2

Line t and $\triangle ECA$ and $\triangle FDB$ are shown on the coordinate grid.



Which statements are true?

Select **all** that apply.

- A. The slope of $\overline{AC}$ is equal to the slope of $\overline{BC}$.
- B. The slope of $\overline{AC}$ is equal to the slope of $\overline{BD}$.
- C. The slope of $\overline{AC}$ is equal to the slope of line t.
- D. The slope of line t is equal to $\frac{EC}{AE}$.
- E. The slope of line t is equal to $\frac{FB}{FD}$.
- F. The slope of line t is equal to $\frac{AE}{FD}$.

8th Grade PARCC EOY Practice Assessment Item #7 (Part 2: Calculator): Standard 8.F.4

A pool cleaning service drained a full pool. The following table shows the number of hours it drained and the amount of water remaining in the pool at that time.

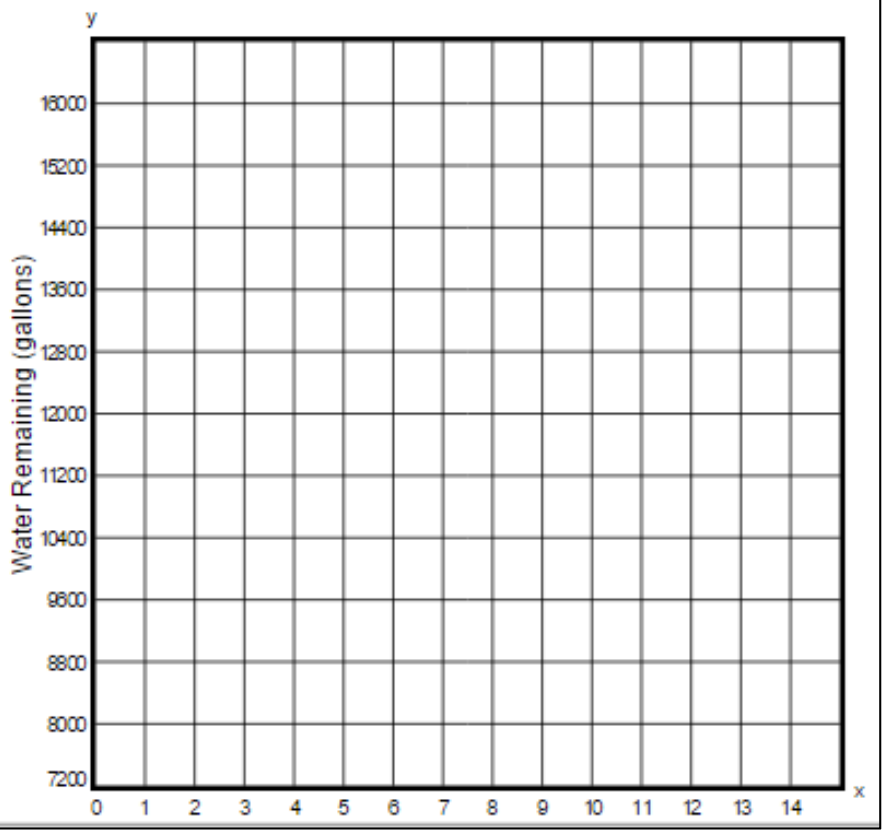
Pool Draining

Time (hours)	3	5	7	9	11
Water Remaining (gallons)	13,200	12,000	10,800	9,600	8,400

Part A

Plot the points that show the relationship between the number of hours elapsed and the number of gallons of water left in the pool.

Select a place on the grid to plot each point.



Part B

The data suggest a linear relationship between the number of hours the pool had been draining and the number of gallons of water remaining in the pool. Assuming the relationship is linear, what does the rate of change represent in the context of this relationship?

- A. The number of gallons of water in the pool after 1 hour.
- B. The number of hours it took to drain 1 gallon of water.
- C. The number of gallons drained each hour.
- D. The number of gallons of water in the pool when it is full.

Part C

What does the *y*-intercept of the linear function represent in the context of this relationship?

- A. The number of gallons of water in the pool after 1 hour.
- B. The number of hours it took to drain 1 gallon of water.
- C. The number of gallons drained each hour.
- D. The number of gallons of water in the pool when it is full.

Part D

Which equation describes the relationship between the time elapsed and the number of gallons of water remaining in the pool?

- A. $y = -600x + 15,000$
- B. $y = -600x + 13,200$
- C. $y = -1,200x + 13,200$
- D. $y = -1,200x + 15,000$

8th Grade PARCC EOY Practice Assessment Item #8 (Part 2: Calculator): Standard 8.EE.5-2

Two different proportional relationships are represented by the equation and the table.

Proportion A

$y = 9x$

Proportion B

x	y
0	0
3	34.5
5	57.5
8	92

Use the drop-down menus to complete the sentence, comparing the rates of change of the proportional relationships.

The rate of change in Proportion A is [Choose...] [Choose...] than the rate of change in Proportion B.

- Choose...
- 1.5
- 2.5
- 25.5
- 43.5

- Choose...
- more
- less

8th Grade PARCC EOY Practice Assessment Item #9 (Part 2: Calculator): Standard 8.SP.3

Eric planted a seedling in his garden and recorded its height each week. The equation shown can be used to estimate the height, h, in inches, of the seedling after w, weeks since Eric planted the seedling.

$$h = \frac{3}{4}w + \frac{9}{4}$$

Part A

What does the slope of the graph of the equation $h = \frac{3}{4}w + \frac{9}{4}$ represent?

- A. the height, in inches, of the seedling after w weeks
- B. the height, in inches, of the seedling when Eric first planted it
- C. the increase in the height, in inches, of the seedling each week
- D. the total increase in the height, in inches, of the seedling after w weeks

Part B

The equation $h = \frac{3}{4}w + \frac{9}{4}$ estimates the height of the seedling to be 8.25 inches after how many weeks?

Enter your answer in the box.

8th Grade PARCC EOY Practice Assessment Item #10 (Part 2: Calculator): Standard 8.F.2

Functions A, B, and C are linear functions.

Some values of Function A are shown in the table.

Function A

x	y
3	3
5	7
6	9

The graph of Function B has a y- intercept of $(0,3)$ and an x- intercept of $(-5,0)$.

Function C is defined by the equation $y = (3x + 1)$.

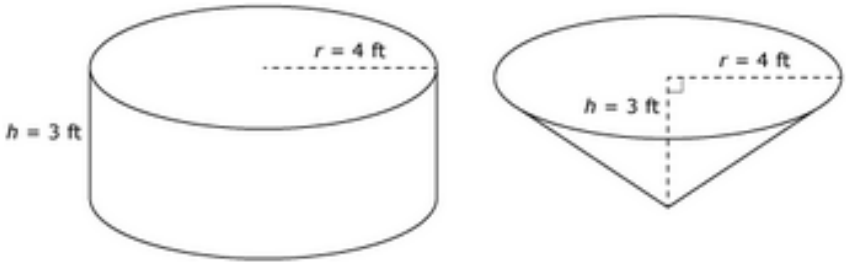
Order the linear functions based on rate of change, from least to greatest.

Least Rate of Change **Greatest Rate of Change**

Function A | Function B | Function C

8th Grade PARCC EOY Practice Assessment Item #11 (Part 2: Calculator): Standard 8.G.9

The figure shows a right-circular cylinder and a right-circular cone. The cylinder and the cone have the same base and the same height.



Part A

What is the volume of the cone, in cubic feet?

- A. 12π
- B. 16π
- C. 36π
- D. 48π

Part B

What is the ratio of the cone's volume to the cylinder's volume?

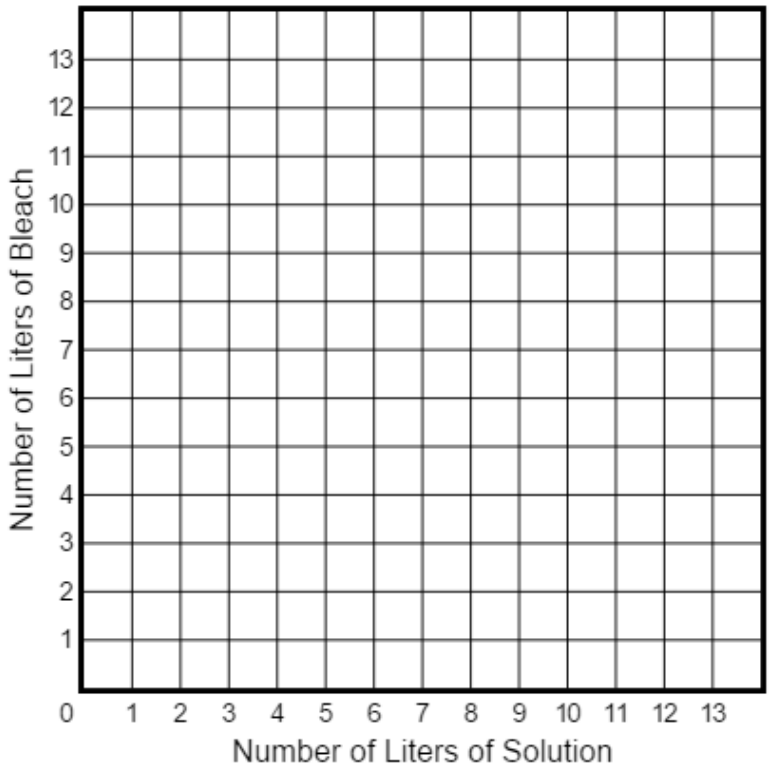
Enter your answer in the space provided. Enter **only** your fraction.

8th Grade PARCC EOY Practice Assessment Item #12 (Part 2: Calculator): Standard 8.EE.5-1

A solution is 20% bleach.

Create a graph that represents all possible combinations of the number of liters of bleach, contained in number of liters of solution.

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



8th Grade PARCC EOY Practice Assessment Item #13 (Part 2: Calculator): Standard 8.EE.4.2

Liz saw the number shown on her calculator screen.

Which numbers represents the number Liz saw?

A. 0.0000006

B. 0.00000006

C. $-6,000,000$

D. $-60,000,000$