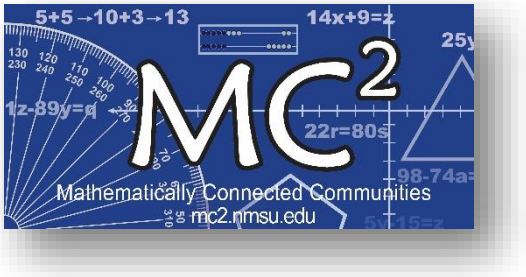
Mathematically Connected Communities



PARCC Practice Test Items
Algebra 1 Mathematics

Excerpted in fall 2017 from:

- *MC² PARCC Practice Test Item Packets-Spring 2017 https://mc2.nmsu.edu/teachers/preparing-for-parcc/ https://mc2.nmsu.edu/teachers/preparing-for-parcc/*
- *MC² PARCC Practice Test Item Packets-Spring 2015 https://mc2.nmsu.edu/teachers/preparing-for-parcc/*
- *Illustrative Mathematics https://www.illustrativemathematics.org/content-standards*

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MC² Thinking Protocol: PARCC Test Prep Using Mathematical Practice Prompts

Use the MC² Thinking Protocol and follow the process below in working with the PARCC practice test 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 test 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.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
1	HS-C.9.1	OGL	Reasoning	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
2	HS-D.2-5	OGL	Modeling	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 22.

A high school is having a talent contest and will give different prizes for the best 5 acts in the show. First place wins the most money, and each place after that wins $50 less than the previous place.

Part A

Create a model that can be used to determine the total amount of prize money based on the value of the first place prize.

Enter your model in the space provided.

Part B

The talent contest has a total of $1,000 in prize money. What is the amount of money for **each** of the five prizes? Show your work.

Enter your answers and your work in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
2	HS-D.2-5	OGL	Modeling	MC^2 PARCC Practice Test Item Packets-Spring 2017

A high school is having a talent contest and will give different prizes for the best 5 acts in the show. First place wins the most money, and each place after that wins $50 less than the previous place.

Part A

Create a model that can be used to determine the total amount of prize money based on the value of the first place prize.

Enter your model in the space provided.

- Math symbols
- Relations
- Geometry
- Groups
- Trigonometry
- Statistics
- Greek

Part B

The talent contest has a total of $1,000 in prize money. What is the amount of money for **each** of the five prizes? Show your work.

Enter your answers and your work in the space provided.

- Math symbols
- Relations
- Geometry
- Groups
- Trigonometry
- Statistics
- Greek

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
3	HS-C.12.1	OGL	Reasoning	MC^2 PARCC Practice Test Item Packets-Spring 2017

Consider the following claim: If the point $(2 + d, y)$ is on the graph of the function $f(x) = x(x - 4)$, then the point $(2 - d, y)$ is also on the graph.

- Use algebra to show that the claim is true.
- What is the relationship between the line $x = 2$ and the graph of $f(x)$? Justify your reasoning.

Enter your work, your answer, and your justification in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standards	Domains	Source
4	HS-C.16.2	OGL	Reasoning	MC^2 PARCC Practice Test Item Packets-Spring 2017

If a is a non-zero, real number and $a(x - 3)^2 - b = c$,

- Prove that $x = 3 \pm \sqrt{\frac{b+c}{a}}$. Show your work.
- If $a = 2$ and $b = 5$, determine what condition(s) on c will restrict the solutions for x to real numbers.

Explain your reasoning.

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

Difficulty Order	Evidence Statement	Common Core State Standards	Domains	Source
5	HS-C.5.5	OGL	Reasoning	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standards	Domain	Source
6	HS-D.2-9	OGL	Modeling	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 38.

The Water Watch program is encouraging customers to reduce the amount of water they use each day. The program is selling low-flow showerheads, which use 2 gallons of water per minute, for $54.00 each.

A family currently has a showerhead that uses 5 gallons of water per minute and is considering replacing it with one of the low-flow showerheads. The family uses the shower an average of 20 minutes per day and pays $0.002 per gallon of water.

Part A

Create a model that can be used to determine the cost savings, in dollars, for the family to purchase and use a low-flow showerhead in terms of the number of days.

Then determine the number of days at which the family will start saving money. Justify your answer in terms of the context.

Enter your model, answer, and justification in the space provided.

Part B

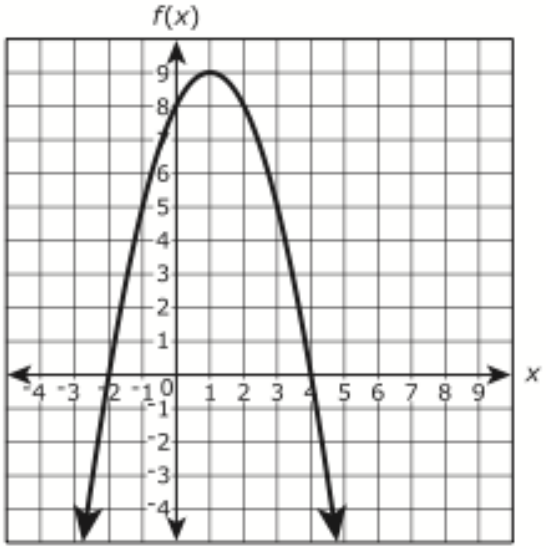
One year after the low-flow showerhead is purchased, the cost of water increases by 5%. Create a new model to determine the cost savings, in dollars, with the increase in the cost of water.

Use your model to determine the number of days at which the family will start saving money after the increase in the cost of water. Justify your answer.

Enter your model, answer, and justification in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standards	Domain	Source
7	F-IF.9-1	HSF.IF.C.9	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

The figure shows a graph of the function of $f(x)$ in the xy-coordinate plane with the vertex at $(1, 9)$ and the zeros at -2 and 4.



The function g is defined by $g(x) = -3x + 2$.

Which statements are true? Select **all** that apply.

A. $f(-2)$ is greater than $g(-2)$.

B. $f(-1)$ is less than $g(-1)$.

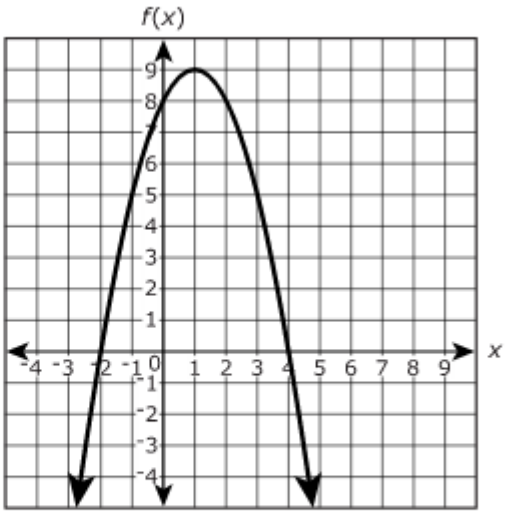
C. $f(0)$ is greater than $g(0)$.

D. $f(1)$ is less than $g(1)$.

E. $f(2)$ is greater than $g(2)$.

Difficulty Order	Evidence Statement	Common Core State Standards	Domains	Source
7	F-IF.9-1	HSF.IF.C.9	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

The figure shows a graph of the function $f(x)$ in the coordinate plane.



A second function, g, is defined by $g(x) = -3x + 2$.

Select the correct phrase in each drop-down menu to complete the sentence.

$f(2)$ [Choose...] $g(2)$ and $f(-2)$ [Choose...] $g(-2)$.

is less than	is less than
is greater than	is greater than
is equal to	is equal to

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
8	HS-D.2-6	OGL	Modeling	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
9	F-IF.1	HSF.IF.A.1	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Jerome is constructing a table of values that satisfies the definition of a function.

Input	−13	20	0	−4	11	−1	17	
Output	−15	−11	−9	−2	−1	5	5	13

Which number(s) can be placed in the empty cell so that the table of values satisfies the definition of a function?

Select **all** that apply.

A. −5

B. −1

C. 0

D. 2

E. 11

F. 17

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
10	HS-C.18.1	SHK	Reasoning	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A through Part C for question 27.

Consider the three points $(-4, -3)$, $(20, 15)$, and $(48, 36)$.

Part A

Which points are on the same line that passes through $(-4, -3)$, $(20, 15)$, and $(48, 36)$?

Select **all** that apply.

A. $(-8, -6)$

B. $(-2, -1)$

C. $(0, 0)$

D. $(4, 3)$

E. $(6, 8)$

Part B

Use the information from Part A to explain why the ratio of the *y*-coordinate to the *x*-coordinate is the same for any point on the line except the *y*-intercept.

Explain why this is not true for the *y*-intercept.

Enter your explanations in the space provided.

Part C

Do the points on the line $y = 3x - 2$ have a constant ratio of the *y*-coordinate to the *x*-coordinate for any point on the line except the *y*-intercept? Explain your answer.

Enter your answer and your explanation in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
11	HS-C.2.1	SHK	Reasoning	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
12	HS-D.1-1	SHK	Modeling	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A through Part C for question 13.

Phil and Matt made cookies for a fundraiser at their high school.

- Phil made 25% more cookies than Matt.
- The cookies sold for $0.25 each.
- After the sale, 20% of the combined total of their cookies remained.

Part A

Create an equation to represent the total amount of money Matt and Phil earned at the fundraiser based on the number of cookies Matt made. Explain how you determined your equation.

Enter your equation and your explanation in the space provided.

Part B

Phil and Matt made a total of $72.00 selling the cookies. How many cookies did Phil make and how many cookies did Matt make? Show your work.

Enter your answers and your work in the space provided.

Part C

Next year Phil and Matt may sell the cookies for $.50 each. They plan to make the same total number of cookies, but they predict that they will only sell 70% of them given the price increase. Based on their prediction, should Phil and Matt raise the price of the cookies? Justify your answer.

Enter your answer and your justification in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
13	F-IF.6-1b	HSF.IF.B.6	Functions	

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Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
14	HS-C.6.1	OGL	Reasoning	MC^2 PARCC Practice Test Item Packets-Spring 2017

Let $|x| + |y| = c$ where, c is a real number.

Determine the number of points that would be on the graph of the equation for **each** given case:

Case 1: $c < 0$

Case 2: $c = 0$

Case 3: $c > 0$

Justify your answers.

Enter your answers and justifications in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
15	A-REI.4a-1	HSA.REI.B.4.A	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

If a is a non-zero, real number and $a(x - 3)^2 - b = c$,

- Prove that $x = 3 \pm \sqrt{\frac{b+c}{a}}$. Show your work.
- If $a = 2$ and $b = 5$, determine what condition(s) on c will restrict the solutions for x to real numbers.

Explain your reasoning.

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

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
16	A-SSE.2-1	HSA.SSE.A.2	Algebra	

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Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
17	A-REI.4b-2	HSA.REI.B.4.B	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

In the equations listed, a, b, c, and d are real numbers. Which of the equations could have solutions that are non-real?

Select **all** that apply.

A. $ax^2 = b$

B. $ax^2 + bx = 0$

C. $ax^2 + bx + c = 0$

D. $(ax + b)(cx + d) = 0$

E. $a(bx + c)^2 = d$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
18	HS-C.5.6	OGL	Reasoning	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
19	F-IF.8a	HSF.IF.C.8.A	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 32.

The area, A, in square feet, of a rectangular storage bin in a warehouse is given by the function $A(x) = -2x^2 + 36x$, where x is the width, in feet, of the storage bin.

Part A

If the function is graphed in a coordinate plane, which statement would be true?

A. The x-intercepts of the function are 0 and 8, which are a lower bound and an upper bound for the possible values of the length of the storage bin.

B. The x-intercepts of the function are 0 and 8, which are a lower bound and an upper bound for the possible values of the width of the storage bin.

C. The x-intercepts of the function are 0 and 18, which are a lower bound and an upper bound for the possible values of the length of the storage bin.

D. The x-intercepts of the function are 0 and 18, which are a lower bound and an upper bound for the possible values of the width of the storage bin.

Part B

The process of completing the square can be used to calculate the width, in feet, of the storage bin that gives a maximum area. What is the missing value?

$$A = -2x^2 + 36x$$

$$A = -2(x - 9)^2 + ?$$

Enter your answer in the box.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
19	F-IF.8a	HSF.IF.C.8.A	Functions	MC² PARCC Practice Test Item Packets-Spring 2017

The area, A, of a pigpen on a farm can be modeled by the equation $A = -2x^2 + 36x$, where x is the width, in feet, of the pen.

Part A

When the equation is graphed in a coordinate plane, the x-intercepts are (0,0) and Choose... ,

(4, 0)
(8, 0)
(18, 0)
(32, 0)

which represent a lower bound and an upper bound for the possible values for the Choose...

of the pen.

area
length
volume
width

Part B

What is the width of the pigpen, in feet, that gives the maximum area?

Enter your answer in the box.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
20	A-CED.4-2	HAS.CED.A.4	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Caroline knows the height and the required volume of a cone-shaped vase she's designing. Which formula can she use to determine the radius of the vase?

A. $r = \sqrt{\frac{V}{3\pi h}}$

B. $r = \sqrt{\frac{3V}{\pi h}}$

C. $r = \frac{\sqrt{3V}}{\pi h}$

D. $r = \pm\sqrt{\frac{3V}{\pi h}}$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
21	A-SSE.3b	HSA.SSE.B.3.B	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2015

Rewrite the function $f(x) = 2x^2 - 8x + 9$ in vertex form by completing the square.

Enter your answers in the boxes.

$f(x) =$ [ ] $(x -$ [ ] $)^2 +$ [ ]

Therefore, $f(x) = 2x^2 - 8x + 9$ has a minimum value of [ ].

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
22	A-SSE.3a	HAS.SSE.B.3.A	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Which factorization can be used to reveal the zeros of the function $f(n) = -12n^2 - 11n + 15$?

A. $f(n) = -n(12n + 11) + 15$

B. $f(n) = (-4n + 3)(3n + 5)$

C. $f(n) = -(4n + 3)(3n + 5)$

D. $f(n) = (4n + 3)(-3n + 5)$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
23	HS-Int.3-1	HAS.CED.A.1 HSF.IF.B.4 HSF.IF.B.6 HSF.LE.A.2	Algebra Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A through Part D for question 40.

The population of a city in 2005 was 36,000. By 2010, the city's population had grown to 43,800 people.

40. Part A

Assuming that the population of the city has grown linearly since 2005 and continues to grow at the same rate, what will be the population in 2015?

Enter your answer in the box.

Part B

Which expression is an appropriate exponential model for the population of the city? Let t represent the time, in years, since 2005.

A. $36{,}000(1.04)^{t}$

B. $36{,}000(1.04)^{5t}$

C. $36{,}000(1.217)^{t}$

D. $36{,}000(1.217)^{5t}$

Part C

Assuming that the population of the city has grown exponentially since 2005 and continues to grow at the same rate, what will be the population in 2015? Give your answer to the nearest whole number.

Enter your answer in the box.

Part D

Another town's population could be modeled by the function $P(t) = 27{,}400(1.66)^{\frac{t}{10}}$, where P represents the population and t represents the time, in years, since 2005. Based on the model, by approximately what percent does the population of this town increase each year?

A. 1

B. 3

C. 5

D. 7

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
24	HS-D.3-3a	OGL	Modeling	

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Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
25	A-SSE.3c-1	HSA.SSE.B.3.C	Algebra	

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Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
26	A-APR.1-1	HSA.APR.A.1	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 2.

Let *a* represent a non-zero rational number and let *b* represent an irrational number.

Part A

Which expression could represent a rational number?

A. $-b$

B. $a + b$

C. ab

D. b^2

Part B

Consider a quadratic equation with integer coefficients and two distinct zeros. If one zero is irrational, which statement is true about the other zero?

A. The other zero must be rational.

B. The other zero must be irrational.

C. The other zero can be either rational or irrational.

D. The other zero must be non-real.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
27	A-REI.3	HSA.REI.B.3	Algebra	Illustrative Mathematics

A-REI Reasoning with linear inequalities

Illustrative Mathematics

Alignments to Content Standards: A-REI.B.3 A-REI.A.1

Task

The following is a student solution to the inequality

$$\frac{5}{18} - \frac{x-2}{9} \leq \frac{x-4}{6}.$$

$$\frac{5}{18} - \frac{x-2}{9} \leq \frac{x-4}{6}$$
$$\frac{5}{18} - \frac{2}{2}\frac{x-2}{9} \leq \frac{3}{3}\frac{x-4}{6}$$
$$\frac{5}{18} - \frac{2x-2}{18} \leq \frac{3x-4}{18}$$
$$5 - (2x-2) \leq 3x-4$$
$$5 - 2x + 2 \leq 3x - 4$$
$$7 - 2x \leq 3x - 4$$
$$-5x \leq -11$$
$$x \leq \frac{11}{5}$$

a. There are two mathematical errors in this work. Identify at what step each mathematical error occurred and explain why it is mathematically incorrect.

The first mathematical error occurred going from line ____ to line ____.

Why it is incorrect:

The second mathematical error occurred going from line ____ to line ____.

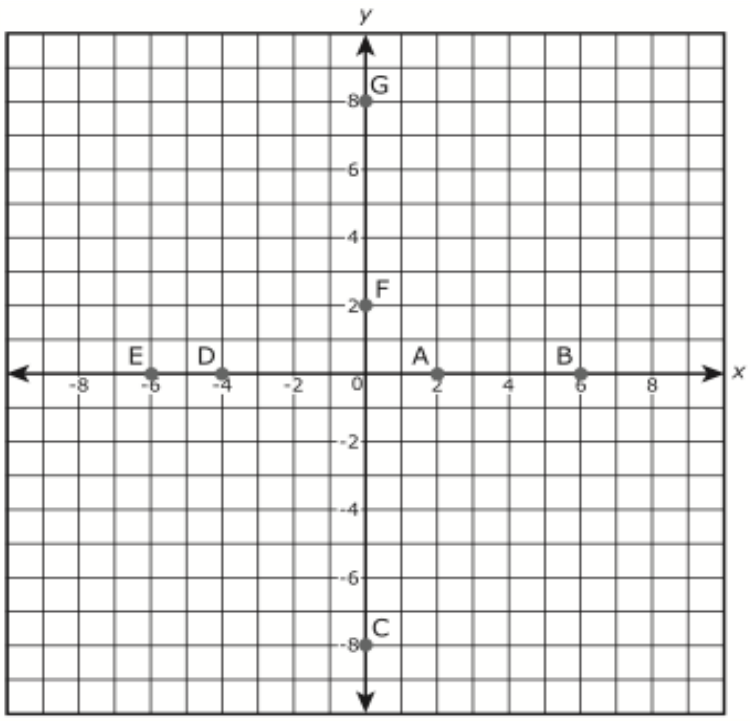
Why it is incorrect:

b. How would you help the student understand his mistakes?

c. Solve the inequality correctly.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
28	A-APR.3-1	HSA.APR.B.3	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Several points are plotted on the graph.



Which of the plotted points on the graph represent the zeros of the function $f(x) = (x^2 + 2x - 8)(x - 6)$? Select **all** that apply.

A. (2, 0)

B. (6, 0)

C. (0, −8)

D. (−4, 0)

E. (−6, 0)

F. (0, 2)

G. (0, 8)

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
28	A-APR.3-1	HSA.APR.B.3	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Determine all zeros for the function $f(x) = (x^2 + 2x - 8)(x - 6)$.

Drag and drop **all** zeros of the function into the box.

−48	−8	−6	−4	−2	0	2	4	6
8	48							

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
29	A-REI.6-1	HSA.REI.C.6	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

In a basketball game, Marlene made 16 field goals. Each of the field goals were worth either 2 points or 3 points, and Marlene scored a total of 39 points from field goals.

Part A

Let x represent the number of 2-point field goals and y represent the number of 3-point field goals. Write a system of equations in terms of x and y to model the situation.

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

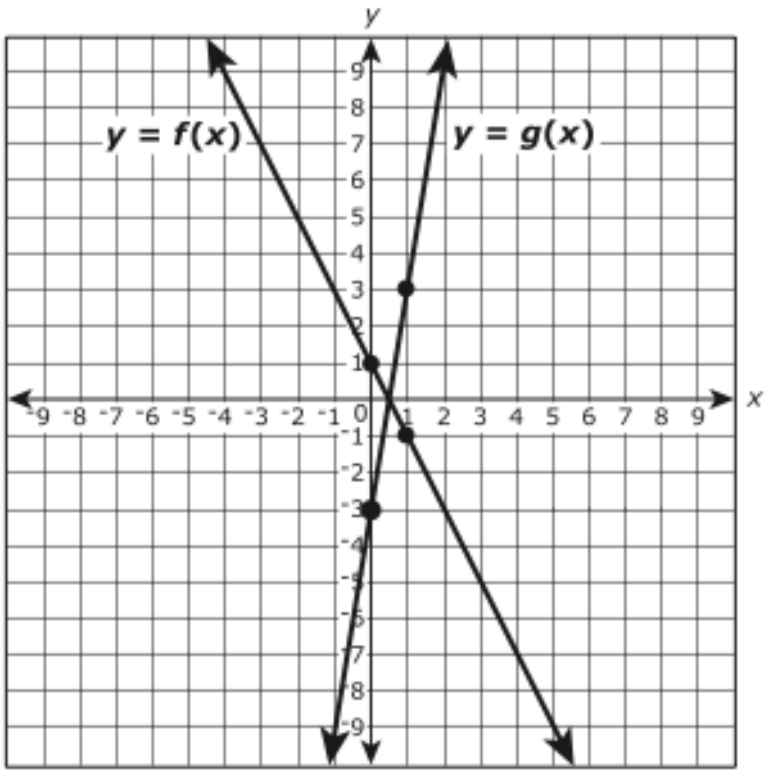
Part B

How many 3-point field goals did Marlene make in the game?

Enter your answer in the box.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
30	F-BF.3-1	HSF.BF.B.3	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

The figure shows the graphs of the functions $y = f(x)$ and $y = g(x)$. The four indicated points all have integer coordinates.



If $g(x) = k \cdot f(x)$, what is the value of k?

Enter your answer in the box.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
31	HS-Int.2	HSA.CED.A.1 HSF.IF.C.7 Multiple	Algebra Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 36.

The function f is defined by $f(x) = x^2 - 2x - 24$.

Part A

If $f(x + 3) = x^2 + kx - 21$, what is the value of k?

Enter your answer in the box.

Part B

What are the zero(s) of $f(x + 3)$?

Select **all** that apply.

A. $x = -7$

B. $x = -4$

C. $x = -2$

D. $x = 0$

E. $x = 3$

F. $x = 6$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
32	F-IF.6-1a	HSF.IF.B.5	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

At the beginning of an experiment, the number of bacteria in a colony was counted at time $t = 0$. The number of bacteria in the colony t minutes after the initial count is modeled by the function $b(t) = 4(2)^t$. Which value and unit represent the average rate of change in the number of bacteria for the first 5 minutes of the experiment?

Select **all** that apply.

A. 24.0

B. 24.8

C. 25.4

D. 25.6

E. bacteria

F. minutes

G. bacteria per minute

H. minutes per bacteria

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
33	F-IF.5-1	HSF.IF.B.5	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

A local theater sells admission tickets for $9.00 on Thursday nights. At capacity, the theater holds 100 customers. The function $M(n) = 9n$ represents the amount of money the theater takes in on Thursday nights, where n is the number of customers. What is the domain of $M(n)$ in this context?

A. all whole numbers

B. all non-negative rational numbers

C. all non-negative integers that are multiples of 9

D. all non-negative integers less than or equal to 100

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
34	A-REI.11-1a	HAS.REI.D.11	Algebra	

Pending New PARCC Released Test Items

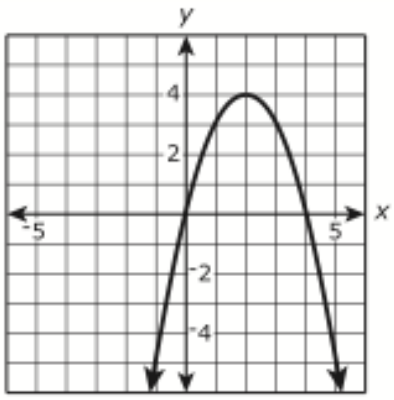
Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
35	F-IF.5-2	HSF.IF.B.5	Functions	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
36	F-IF.4-1	HSF.IF.B.4	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 9.

The function $f(x) = 4x - x^2$ is graphed in the xy-coordinate plane as shown.



Part A

Based on the graph of the function, which statements are true?

Select **all** that apply.

A. f is increasing on the interval $x < 0$.

B. f is decreasing on the interval $x < 0$.

C. f is increasing on the interval $0 < x < 2$.

D. f is decreasing on the interval $0 < x < 2$.

E. f is increasing on the interval $2 < x < 4$.

F. f is decreasing on the interval $2 < x < 4$.

G. f is increasing on the interval $x > 4$.

H. f is decreasing on the interval $x > 4$.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
36 Continued	F-IF.4-1	HSF.IF.B.4	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Part B

Based on the graph of the function, which statements are true?

Select **all** that apply.

A. $f(x) < 0$ on the interval $x < 0$.

B. $f(x) > 0$ on the interval $x < 0$.

C. $f(x) < 0$ on the interval $0 < x < 2$.

D. $f(x) > 0$ on the interval $0 < x < 2$.

E. $f(x) < 0$ on the interval $2 < x < 4$.

F. $f(x) > 0$ on the interval $2 < x < 4$.

G. $f(x) < 0$ on the interval $x > 4$.

H. $f(x) > 0$ on the interval $x > 4$.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
37	HS-Int.3-2	HSA.CED.A.1 HSF.LE.A.2 HSF.LE.B.5	Algebra Functions	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
38	N-RN.B.1	HSN.RN.B.3	Number & Quantity	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 2.

Let *a* represent a non-zero rational number and let *b* represent an irrational number.

Part A

Which expression could represent a rational number?

A. $-b$

B. $a + b$

C. ab

D. b^2

Part B

Consider a quadratic equation with integer coefficients and two distinct zeros. If one zero is irrational, which statement is true about the other zero?

A. The other zero must be rational.

B. The other zero must be irrational.

C. The other zero can be either rational or irrational.

D. The other zero must be non-real.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
39	A-REI.10	HSA.REI.D.10	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Which points are on the graph of the equation $-3x + 6y + 5 = -7$?

Select **all** that apply.

A. $(-3, 6)$

B. $(-2,0)$

C. $(0, -2)$

D. $(6, -3)$

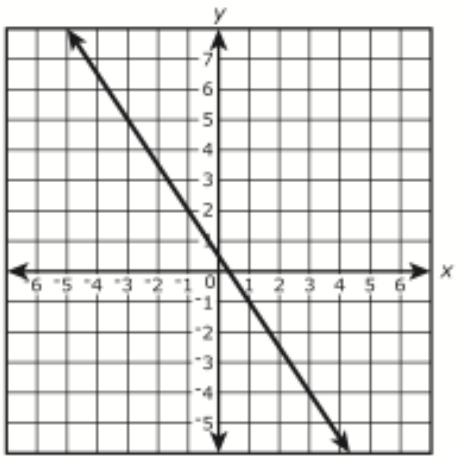
E. $(8, 2)$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
39	A-REI.10	HSA.REI.D.10	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

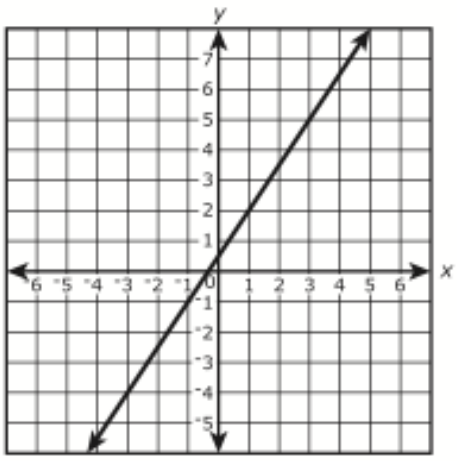
The ordered pairs $(20, -29.5), (21, -31)$, and $(22, -32.5)$ are points on the graph of a linear equation.

Which of the following graphs shows **all** of the ordered pairs in the solution set of this linear equation?

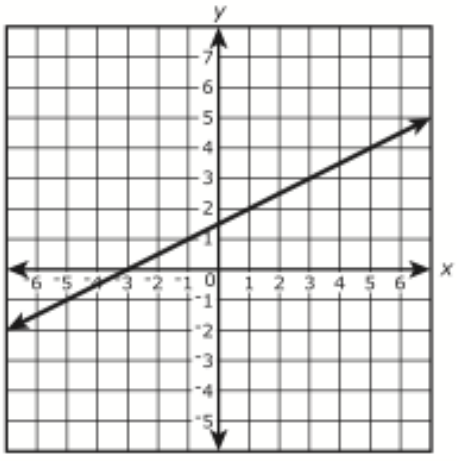
A.



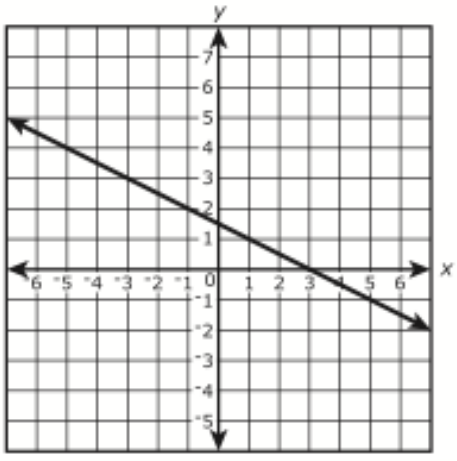
B.



C.



D.



Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
40	F-IF.7b	HSF.IF.C.7.B	Functions	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
41	A-REI.4b-1	HAS.REI.B.4.B	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Find the equation that is equivalent to the quadratic equation shown.

$$x^2 - 6x - 27 = 0$$

A. $x(x - 3) = 27$

B. $(x - 6)^2 = 63$

C. $(x - 3)^2 = 36$

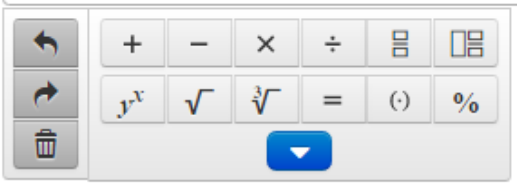
D. $(x - 3)^2 = 28$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
41	A-REI.4b-1	HAS.REI.B.4.B	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

What are the solutions to the equation $\frac{3}{4}x^2 = 48$?

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

$x = \square$ $x = \square$



Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
42	A-SSE.2-4	HAS.SSE.A.2	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 6.

Consider the function $f(x) = 2x^2 + 6x - 8$.

Part A

What is the vertex form of $f(x)$?

A. $f(x) = 2(x - 3)^2 - 4$

B. $f(x) = 2(x + 3)^2 - 4$

C. $f(x) = 2(x - 1.5)^2 - 12.5$

D. $f(x) = 2(x + 1.5)^2 - 12.5$

Part B

What is a factored form of $f(x)$?

A. $f(x) = (2x + 1)(x - 8)$

B. $f(x) = (2x - 1)(x + 8)$

C. $f(x) = 2(x + 4)(x - 1)$

D. $f(x) = 2(x - 4)(x + 1)$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
42	A-SSE.2-4	HAS.SSE.A.2	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Find the equation that is equivalent to the quadratic equation shown.

$$x^2 - 6x - 27 = 0$$

A. $x(x - 3) = 27$

B. $(x - 6)^2 = 63$

C. $(x - 3)^2 = 36$

D. $(x - 3)^2 = 28$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
42	A-SSE.2-4	HAS.SSE.A.2	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Consider the function $f(x) = 2x^2 + 6x - 8$.

Part A

Fill in the missing portions of the equation to rewrite $f(x)$ to reveal the vertex of the graph of the function.

Enter your answers in the boxes. Use decimals if necessary.

$f(x) = 2(x + \square)^2 + \square$

Part B

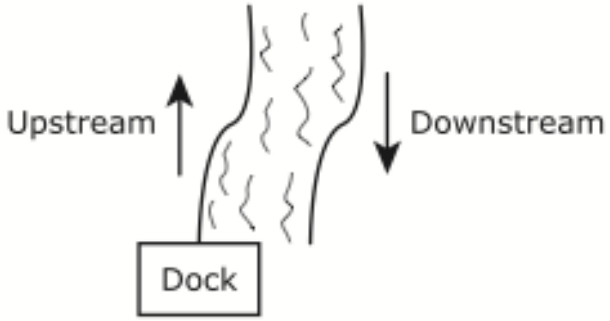
Fill in the missing portions of the equation to rewrite $f(x)$ to reveal the zeros of the function.

Enter your answers in the boxes. Use decimals if necessary.

$f(x) = 2(x + \square)(x + \square)$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
43	HS-D.3-1a	OGL	Modeling	MC² PARCC Practice Test Item Packets-Spring 2017

Gabriel operates a riverboat and frequently offers tours of the river. Typically, a tour lasts for 3.25 hours. The riverboat usually takes 2.00 hours to make the 25-mile trip upstream from the dock and 1.25 hours to make the 25-mile return trip downstream.



Gabriel is considering offering a shorter tour that will last 2.50 hours and travel only 20 miles upstream before returning. Will the shorter tour be possible if the riverboat travels at the same speed as it does in the 3.25-hour tour? Show your steps and justify your answer.

Enter your answer, your work, and your justification in the space provided.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
44	HS-D.2-8	OGL	Modeling	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
45	F-IF.2	HSF.IF.A.2	Functions	Illustrative Mathematics

Illustrative Mathematics

F-IF Cell phones

Alignments to Content Standards: F-IF.A.2

Task

Let $f(t)$ be the number of people, in millions, who own cell phones t years after 1990. Explain the meaning of the following statements.

a. $f(10) = 100.3$

b. $f(a) = 20$

c. $f(20) = b$

d. $n = f(t)$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
46	F-IF7a-2	HSF.IF.C.7.A	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2015

Graph $f(x) = -(x-2)^2 + 4$.

- Select a button to choose the type of graph.
- Drag the two points to the correct positions.

Linear

Absolute Value

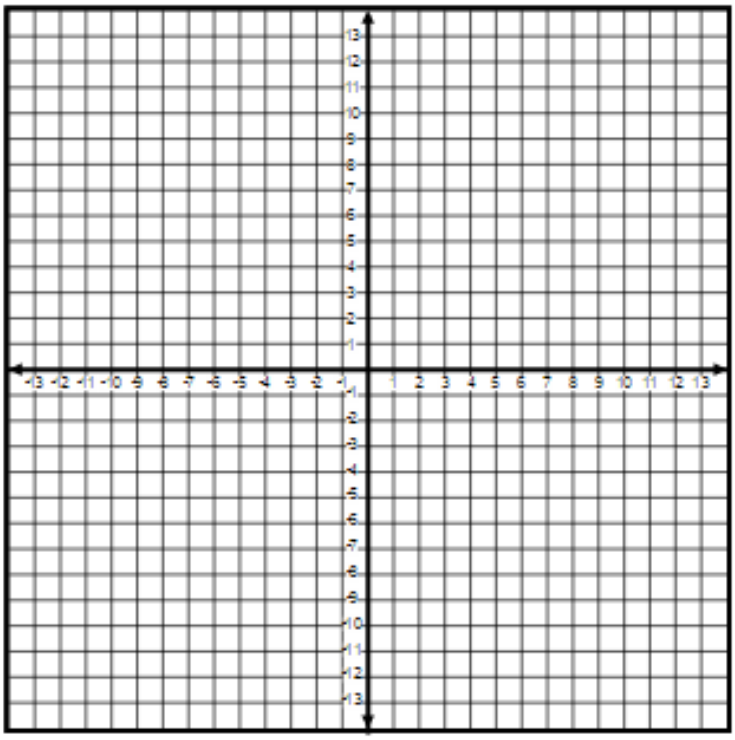
Quadratic

Exponential

Logarithmic

Sin/Cos

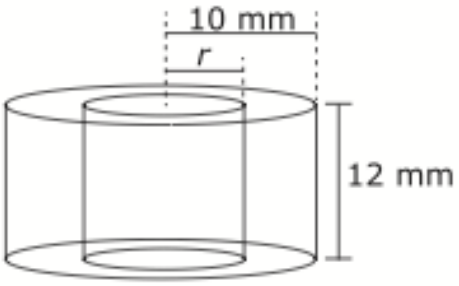
Tan/Cotan



Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
47	F-Int.1-1	Multiple	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Use the information provided to answer Part A and Part B for question 30.

The diagram shows two cylinders with bases that have the same center and heights of 12 millimeters.



Part A

Which is a function for the volume, V, that is inside the larger cylinder but outside the one with the smaller radius, r?

A. $V(r) = 1{,}200\pi - 12\pi r^2$

B. $V(r) = 120\pi - 12\pi r^2$

C. $V(r) = 12\pi r^2$

D. $V(r) = 12\pi(10 - r)^2$

Part B

Suppose that there is space between the inner and outer cylinders and the radius of the inner cylinder must be an integer greater than or equal to 3. What is the domain of V?

A. all integers greater than or equal to 3

B. 3, 4, 5, 6, 7, 8, 9, or 10

C. 3, 4, 5, 6, 7, 8, or 9

D. $3 \leq r \leq 9$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
48	HS-C.10.1	OGL	Reasoning	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
49	F-LE.2-2	HSF.LE.A.2	Functions	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
50	A-SSE.1-2	HAS.SSE.A.1	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

A ball was thrown upward into the air. The height, in feet, of the ball above the ground t seconds after being thrown can be determined by the expression $-16t^2 + 40t + 3$. What is the meaning of the 3 in the expression?

A. The ball took 3 seconds to reach its maximum height.

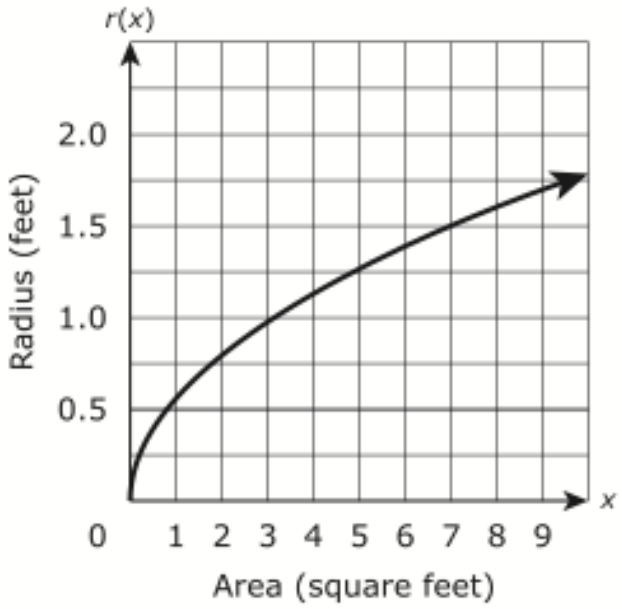
B. The ball took 3 seconds to reach the ground.

C. The ball was thrown from a height of 3 feet.

D. The ball reached a maximum height of 3 feet.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
51	**F-IF.6-6b**	**HSF.IF.B.6**	**Functions**	**MC² PARCC Practice Test Item Packets-Spring 2017**

The function $r(x)$ represents the radius of a circle for a given area, x. A graph of the function is shown in the figure.



According to the graph, what is the approximate average rate of change in the radius of the circle as the area increases from 3 square feet to 7 square feet?

A. 0.125 foot per square foot

B. 0.25 foot per square foot

C. 0.5 foot per square foot

D. 8 feet per square foot

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
52	A-CED.4-1	HAS.CED.A.4	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

The formula for finding the perimeter, P, of a rectangle with length l and width w is given.

$$P = 2l + 2w$$

Which formula shows how the length of a rectangle can be determined from the perimeter and the width?

A. $l = \frac{P}{2} - 2w$

B. $l = \frac{P-2w}{2}$

C. $l = \frac{P}{2} + w$

D. $l = \frac{P-2}{2w}$

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
53	S-ID.Int.1	Multiple	Statistics & Probability	

Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
54	F-IF.6-6a	HSF.IF.B.6	Functions	Illustrative Mathematics

F-IF Mathemafish Population

Alignments to Content Standards: F-IF.B.6

Task

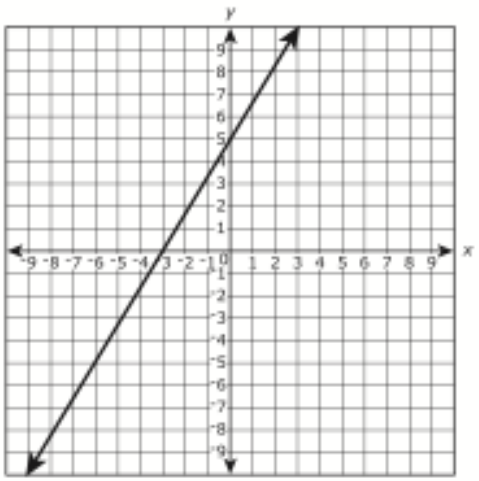
You are a marine biologist working for the Environmental Protection Agency (EPA). You are concerned that the rare coral mathemafish population is being threatened by an invasive species known as the fluted dropout shark. The fluted dropout shark is known for decimating whole schools of fish. Using a catch-tag-release method, you collected the following population data over the last year.

# months since 1st measurement	0	1	2	3	4	5	6	7	8	9	10	11	12
Mathemafish population	480	472	417	318	240	152	103	84	47	32	24	29	46

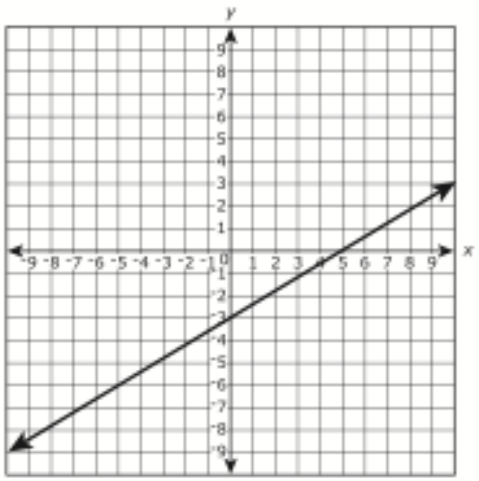
Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
55	F-IF.7a-1	HSF.IF.A.1 HSF.IF.A.2	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Which graph represents the equation $5y - 3x = -15$?

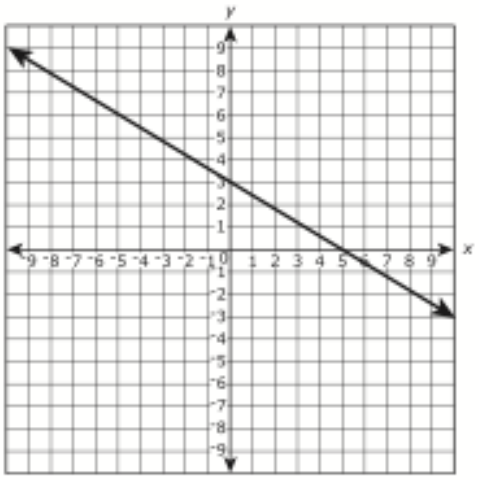
A.



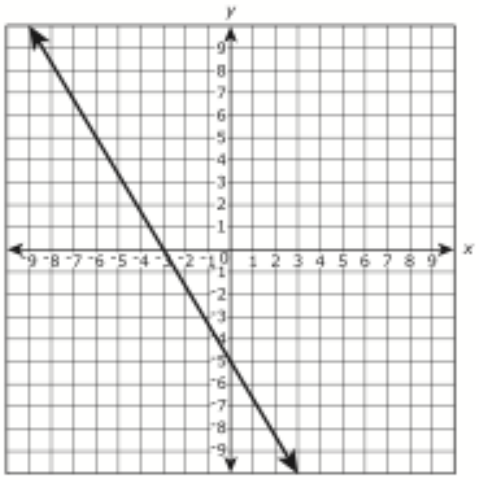
B.



C.



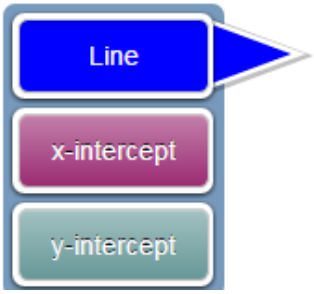
D.

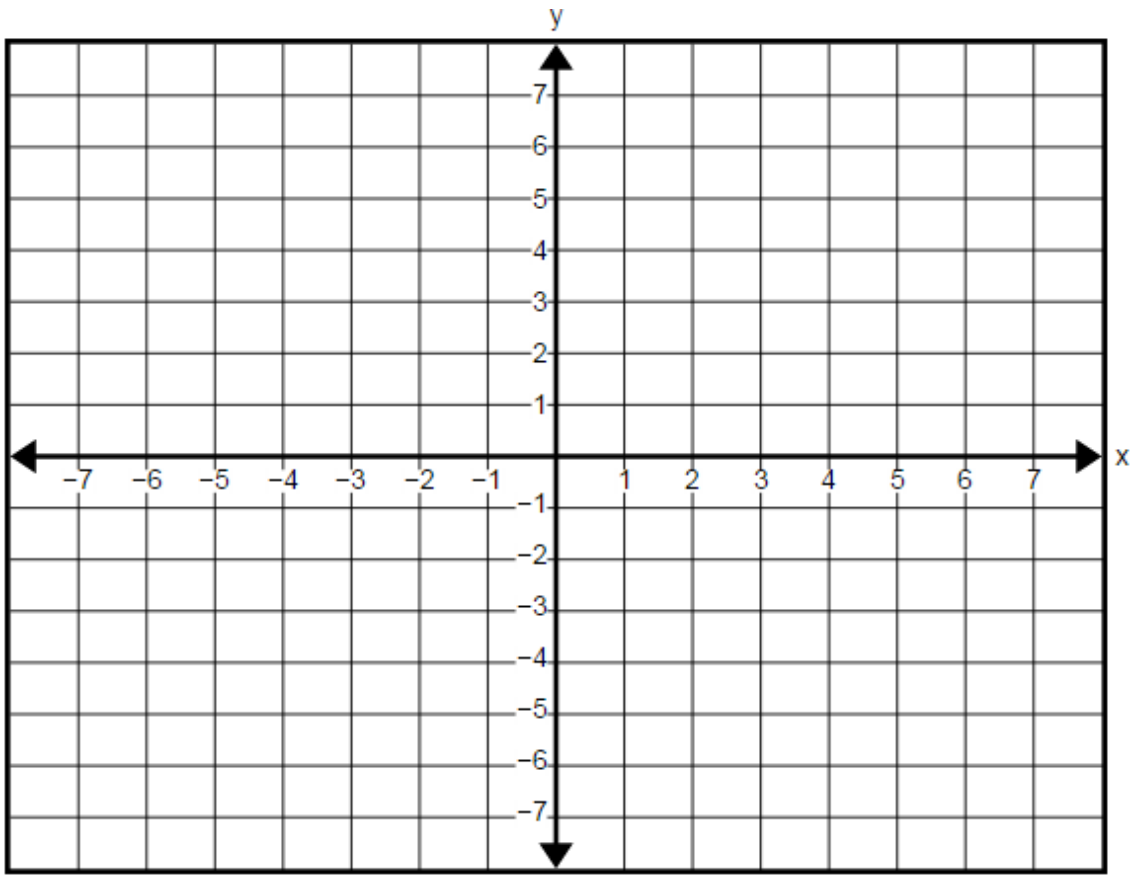


Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
55	F-IF.7a-1	HSF.IF.A.1 HSF.IF.A.2	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

Graph the equation $6x - 4y = 12$ on the *xy*-coordinate plane. Identify the *x*-intercept of the graph and the *y*-intercept of the graph.

Select the Line button. To graph a line, select two points on the coordinate plane and a line will be drawn through the points. Then select the *x*-intercept button to identify the *x*-intercept and select the *y*-intercept button to identify the *y*-intercept.





Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
56	F-IF.7a-1	HSF.IF.C.7.A	Functions	

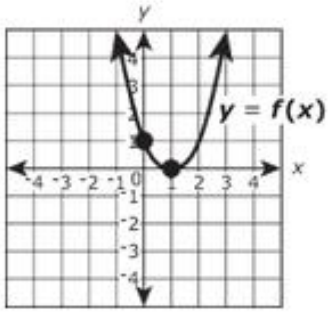
Pending New PARCC Released Test Items

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
57	HS-Int.1	HSA.REI.B.4 HSA.REI.B.4.B HSF.BF.A.1 HSF.IF.C.7.A HSF.IF.C.8.A	Algebra Functions	

Pending New PARCC Released Test Items

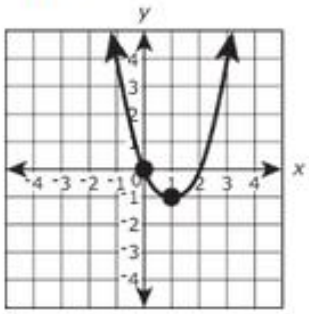
Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
58	F-BF.3-4	HSF.BF.B.3	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2015

Consider the function, $f(x)$, shown on the coordinate plane.



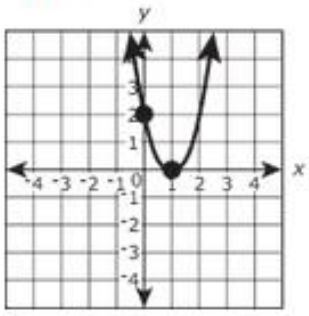
Identify the equations in the form $y = pf(x + r) + n$ which generate each of the graphs shown as a transformation of $f(x)$. Enter a number into each of the available boxes.

Part A



$y =$ ____ $f(x +$ ____ $) +$ ____

Part B



$y =$ ____ $f(x +$ ____ $) +$ ____

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
59	S-ID.Int.2	HSS.ID.A.1 HSS.ID.A.2 HSS.ID.B.5 HSS.ID.B.6A HSS.ID.B.6.B	Statistics & Probability	MC^2 PARCC Practice Test Item Packets-Spring 2017

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

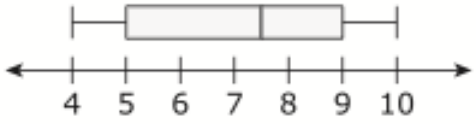
Members of two cross-country teams ran an obstacle course. The table shows the times, in minutes and seconds, for the members of team R to complete the course.

Team R Obstacle Course Times

5:32	6:48	4:25	8:05	7:23
5:37	5:12	6:26	5:31	4:43
6:08	7:16	5:52	5:21	6:53
4:49	5:02	6:33	5:54	6:20

The obstacle course times, in minutes and seconds, for team S are summarized in the box plot shown.

Team S Obstacle Course Times

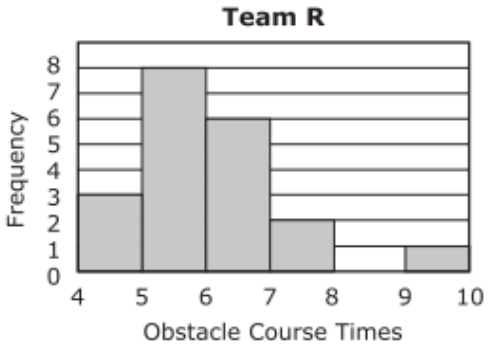


Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
59 Continued	S-ID.Int.2	HSS.ID.A.1 HSS.ID.A.2 HSS.ID.B.5 HSS.ID.B.6A HSS.ID.B.6.B	Statistics & Probability	MC^2 PARCC Practice Test Item Packets-Spring 2017

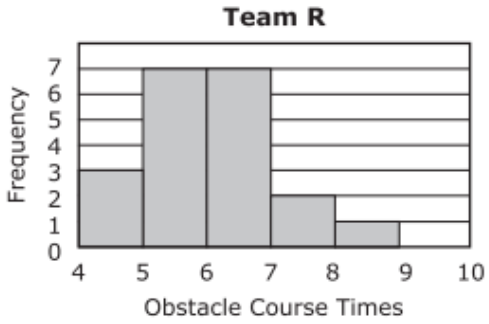
Part A

Which histogram represents the times from Team R on the obstacle course?

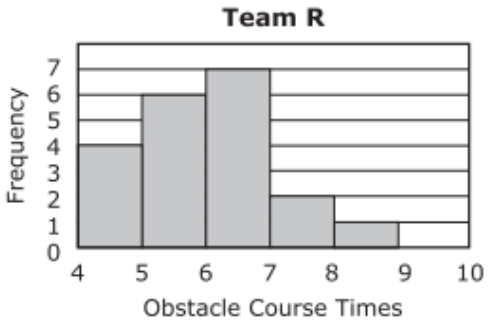
A.



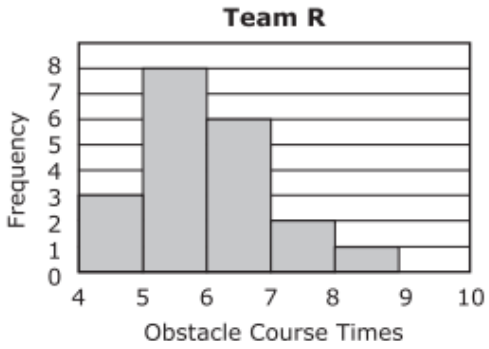
B.



C.



D.



Part B

Which statements are true about the data for team R and team S?

Select **all** that apply.

A. The median time of team R is less than the median time of team S.

B. The median time of team R is greater than the median time of team S.

C. The interquartile range of team R is less than the interquartile range of team S.

D. The interquartile range of team R is equal to the interquartile range of team S.

E. The data for team R is skewed to the left.

F. The data for team S includes an outlier.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
60	A-CED.3.1	HSA.CED.A.3	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

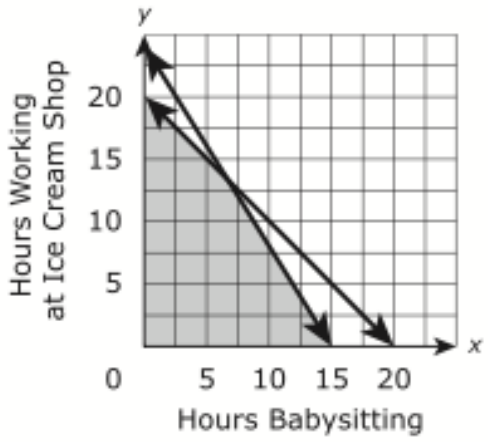
Use the information provided to answer Part A through Part D for question 11.

Leah would like to earn at least \$120 per month. She babysits for \$5 per hour and works at an ice cream shop for \$8 per hour. Leah cannot work more than a total of 20 hours per month. Let x represent the number of hours Leah babysits and let y represent the number of hours Leah works at the ice cream shop.

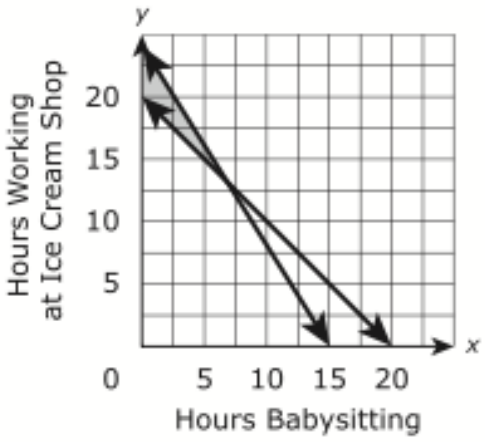
Part A

Which graph shows the set of points that represents the number of hours that Leah can work in order to earn at least \$120 and not work more than 20 hours per month?

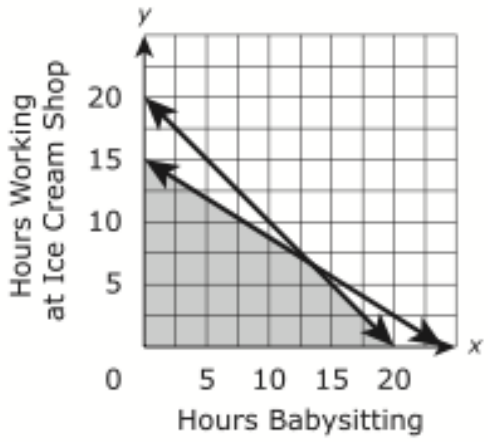
A.



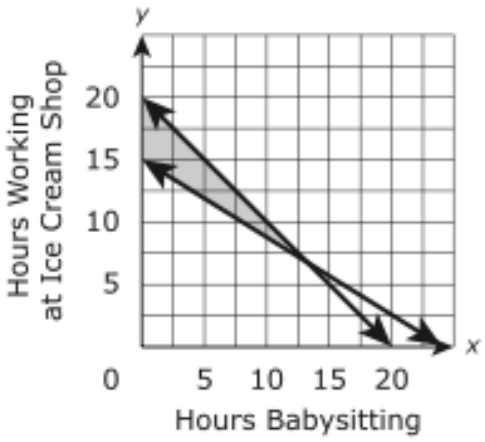
B.



C.



D.



Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
60 Continued	A-CED.3.1	HSA.CED.A.3	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Part B

Which pairs (x, y) represent hours that Leah could work to meet the given conditions?

Select **all** that apply.

A. $(4, 15)$

B. $(5, 12)$

C. $(10, 9)$

D. $(15, 5)$

E. $(19, 1)$

Part C

If Leah babysits for 7 hours this month, what is the minimum number of hours she would have to work at the ice cream shop to earn at least $120?

Give your answer to the nearest whole hour.

Enter your answer in the box.

Part D

Leah prefers babysitting over working at the ice cream shop. Out of 20 total hours, what is the maximum number of hours she can babysit to be able to earn at least $120 per month?

Give your answer to the nearest whole hour.

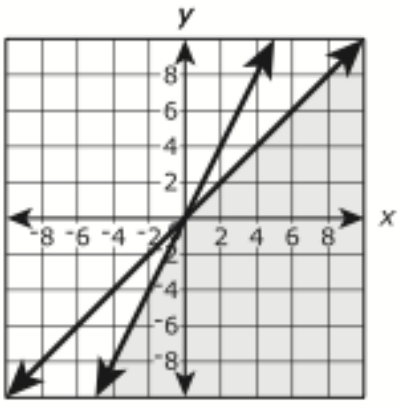
Enter your answer in the box.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
61	A-REI.12	HAS.REI.D.12	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

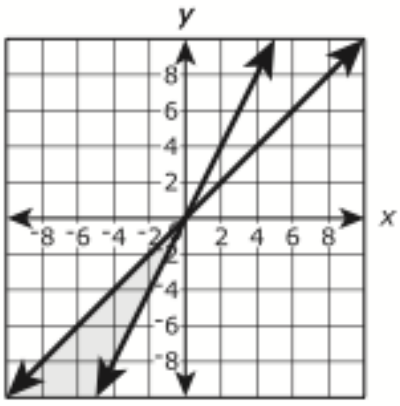
Which graph **best** represents the solution to this system of inequalities?

$$x + y \leq 6$$
$$x + 2y \leq 8$$

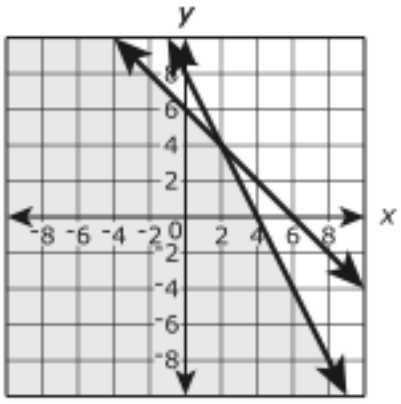
A.



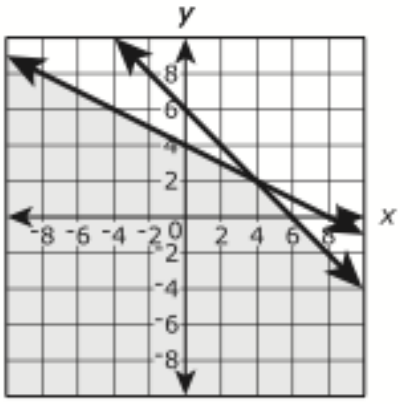
B.



C.



D.

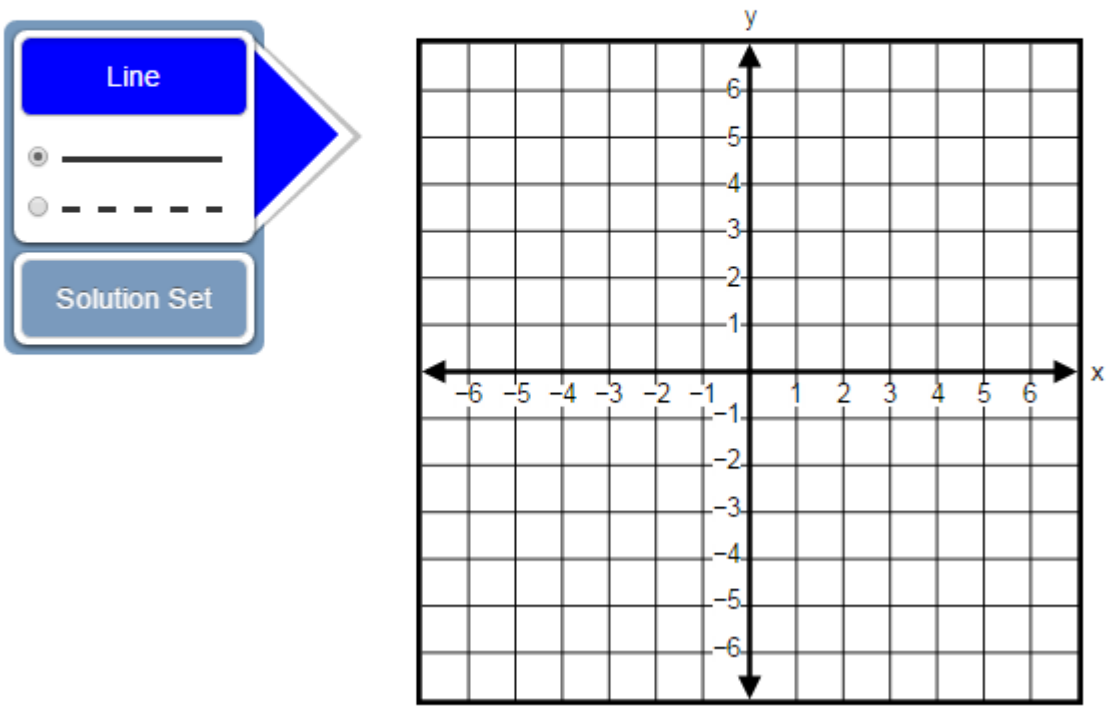


Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
61	A-REI.12	HAS.REI.D.12	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Graph the solution set of $2x + y > 6$.

Graph the solution set of the linear inequality in the coordinate plane by

- selecting the "line" button to graph the line and choosing the line style,
- selecting the "solution set" button to select the desired region.



Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
62	S-ID.5	HSS.ID.B.5	Statistics & Probability	MC^2 PARCC Practice Test Item Packets-Spring 2017

A random sample of 200 teenagers participated in a taste test. Each teenager sampled four choices of fruit drink (labeled A, B, C, and D), and then were asked to pick a favorite. The table shows the results of this taste test.

	A	B	C	D	Total
Boys	45	25	30	20	120
Girls	25	10	30	15	80
Total	70	35	60	35	200

Based on the information given, which of the given statements are true?

Select **all** that apply.

A. 40% of the participants were girls.

B. 70% of the participants preferred A.

C. $\frac{20}{120}$ of the boys preferred D.

D. $\frac{10}{35}$ of the participants who preferred B were girls.

E. The proportion of boys who preferred C is equal to the proportion of girls who preferred C.

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
63	A-SSE.1-1	HAS.SSE.A.1	Algebra	MC^2 PARCC Practice Test Item Packets-Spring 2017

Elephant Population Estimates—Namibia

Combined estimates for Etosha National Park and the Northwestern Population

Year	Base Year	Estimated Number of Elephants
1998	3	3,218
2000	5	3,628
2002	7	3,721
2004	9	3,571

The elephant population in northwestern Namibia and Etosha National Park can be predicted by the expression $2{,}649(1.045)^{b}$, where b is the number of years since 1995.

What does the value 2,649 represent?

A. the predicted increase in the number of elephants in the region each year

B. the predicted number of elephants in the region in 1995

C. the year when the elephant population is predicted to stop increasing

D. the percentage the elephant population is predicted to increase each year

Difficulty Order	Evidence Statement	Common Core State Standard	Domain	Source
64	F-LE.2-1	HSF.LE.A.2	Functions	MC^2 PARCC Practice Test Item Packets-Spring 2017

A certain type of lily plant is growing in a pond in such a way that the number of plants is growing exponentially. The number of plants, N, in the pond at time t is modeled by the function $N(t) = ab^t$, where a and b are constants and t is measured in months. The table shows two values of the function.

t	$N(t)$
0	150
1	450

Which equation can be used to find the number of plants in the pond at time t?

A. $N(t) = 150(1)^t$

B. $N(t) = 450(1)^t$

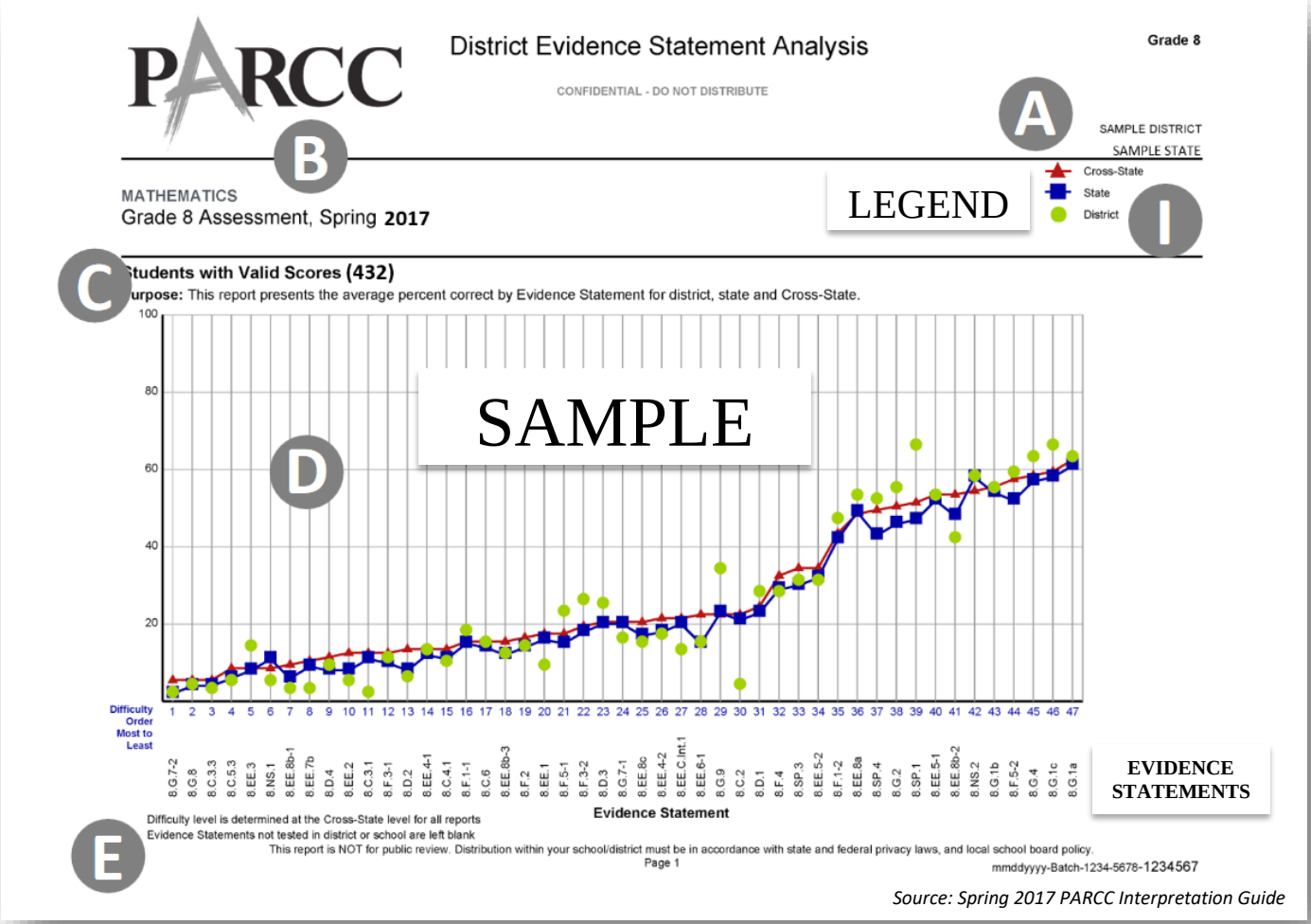
C. $N(t) = 150(3)^t$

D. $N(t) = 450(3)^t$

User's Guide

To support New Mexico educators in preparing students for the Spring 2018 PARCC Assessment, Mathematically Connected Communities (MC^2) has again compiled *Practice Test Item Packets* posted on the MC^2 website. Each packet is **organized in order of difficulty (most to least)** based on the *Spring 2017 Evidence Statement Analysis* at the cross-state level used for all reports. Each grade-level/subject analysis contains a graph (see sample below) representing the following data:

- Average percent correct for each item represented by **cross-state** (aggregation of all states in PARCC consortium), **state**, **district**, and for the school report, at school level (see legend below)
- Evidence Statements are located along the bottom and left blank on the district/school report if not tested in that particular location (see below)



Source: Spring 2017 PARCC Interpretation Guide

Each page contains **only one problem** and identifies the following for that item:

Difficulty Order The practice test items are presented in order from most to least difficult based on the *Spring 2017 Evidence Statement Analysis* at the cross-state level used for all reports. Since the harder problems are found at the beginning of the document, teachers may want to start with the easier items at the end.

Evidence Statements

Describe the knowledge and skills that the assessment item/task elicits from students and are derived from the Common Core State Standards for Mathematics (CCSS-M). Evidence Statements for grades 3 through 8 will begin with the grade number. High School Evidence Statements begin with "HS" or with the label for a conceptual category. Numbers at the end of *Integrated Evidence Statements* and those focused on *Reasoning* and *Modeling* are added for assessment clarification and tracking purposes. Evidence Statement documents are available at: http://parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents

An Evidence Statement might:

1. **Use exact language as the CCSS-M.** For example, Evidence Statement 8.EE.1 uses the exact language as standard 8.EE.1 *Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3-5 = 3-3 = 1/33 = 1/27.*

2. **Be derived by focusing on specific parts of a standard.** For example, CCSS-M 8.F.5 *Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally* was split into the following two Evidence Statements:
   - 8.F.5-1 *Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear).*
   - 8.F.5-2 *Sketch a graph that exhibits qualitative features of a function that has been described verbally.*

   Together these two evidence statements are CCSS-M 8.F.5.

3. **Be integrative (Int).** Integrative Evidence Statements allow for the testing of more than one of the Common Core Standards and can be integrated across all content within a grade/course, all standards in a high school conceptual category, all standards in a domain, or all standards in a cluster. For example:
   - **Grade/Course–4.Int.2** (Integrated across Grade 4)
   - **Conceptual Category–F.Int.1** (Integrated across the Functions Conceptual Category)
   - **Domain–4.NBT.Int.1** (Integrated across the Number and Operations in Base Ten Domain)
   - **Cluster–3.NF.A.Int.1** (Integrated across the Number and Operations–Fractions Domain, Cluster A)

4. **Focus on mathematical reasoning.** A Reasoning Evidence Statement (keyed with C as per PARCC Claims Structure, see pg. 4) will state the type of reasoning that an item/task will require and content scope from the CCSS-M that the item/task will require students to reason about. Such as, Evidence Statement 3.C.2
   - Type of Reasoning: *Base explanations/reasoning on the relationship between addition and subtraction or the relationship between multiplication and division.*
   - Content Scope: Knowledge and skills are articulated in 3.OA.6

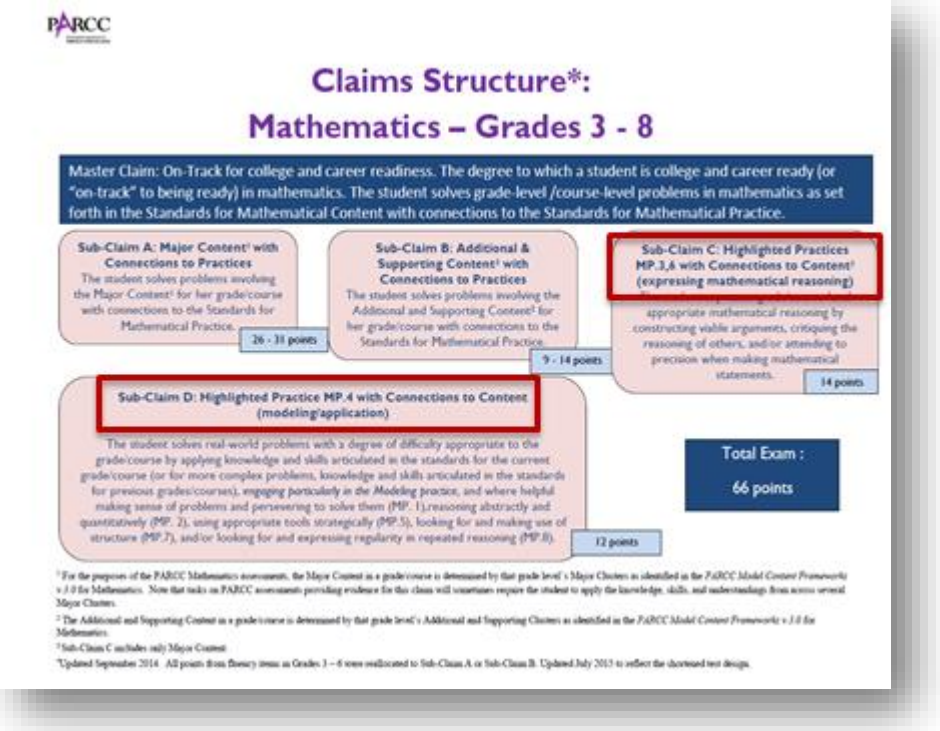
   When the focus is on reasoning, the Evidence Statement may also require the student to reason about *securely held knowledge* (SHK-see pg. 4) from a previous grade.

5. **Focus on mathematical modeling.** A Modeling Evidence Statement (keyed with D as per PARCC Claims Structure, see pg. 4) will state the type of modeling that an item/task will require and the content scope from the CCSS-M that the item/task will require students to model about.

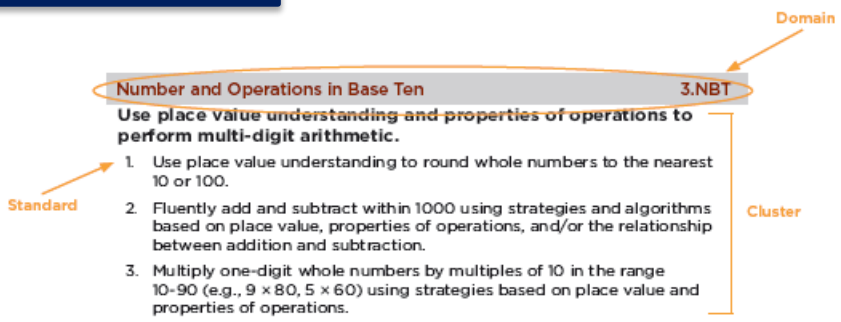
   For example, Evidence Statement HS.D.5:
   - Type of Modeling: Given an equation or system of equations, reason about the number or nature of the solutions.
   - Content Scope: A-REI.11, involving any of the function types measured in the standards.

   Evidence Statement 4.D.2 below is of an example in which an item/task aligned to the evidence statement will require the student to model *on grade level* (OGL), using *securely held knowledge* from a previous grade.
   - Type of Modeling: Solve multi-step contextual problems with degree of difficulty appropriate to Gr. 4
   - Securely Held Knowledge: requiring application of knowledge and skills articulated in 3.OA.A, 3.OA.8, 3.NBT, and/or 3.MD.

Sub-Claim C (expressing mathematical reasoning) and Sub-Claim D (modeling/application) in the PARCC Claims Structure are not explicitly found in the CCSS-M as domains but are included in the Mathematical Practices.



Common Core State Standards http://www.corestandards.org/Math/



An Evidence Statement focusing on Reasoning or Modeling will not indicate a specific standard in the Common Core column because these are not explicitly found in the CCSS-M as a domain. Instead it will indicate:

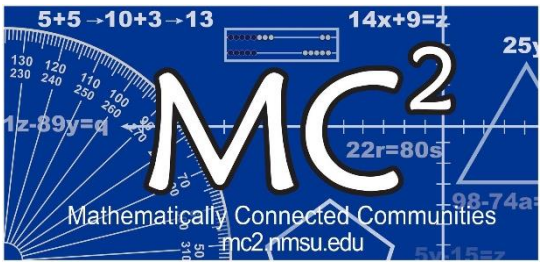
- **OGL-On Grade Level**
- **Securely Held Knowledge (SHK)**-Ability to flexibly apply what one already knows to a non-routine or complex problem. For example, modeling is a sophisticated practice. This means that modeling and other complex tasks will naturally draw upon securely held knowledge and skills. Some tasks may demand flexible application of content knowledge first gained in previous grades to solve complex problems. Examples of standards which refer to *securely held knowledge* begin with the words *Apply and Extend.*

Domains

- Modeling & Reasoning
- Functions
- Algebra
- Number & Quantity
- Statistics & Probability

Sources

Identifies where the practice test item was excerpted from (e.g., MC^2 PARCC Practice Test Item Packets-Spring 2017, Illustrative Mathematics)



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