

**A.REI.1****SELECTED RESPONSE**

Select the correct answer.

1. What two properties are used in the following solution to  $4b - 3 = 17$ ?

$$4b - 3 = 17$$

$$4b - 3 + 3 = 17 + 3$$

$$4b = 20$$

$$\frac{4b}{4} = \frac{20}{4}$$

$$b = 5$$

- (A) Addition Property of Equality and Division Property of Equality
- (B) Subtraction Property of Equality and Addition Property of Equality
- (C) Multiplication Property of Equality and Distributive Property
- (D) Subtraction Property of Equality and Zero Product Property
2. Which of the following properties would not be used to justify any of the steps below?

$$\frac{7}{2}n = 3n + 4$$

$$2\left(\frac{7}{2}n\right) = 2(3n + 4)$$

$$7n = 6n + 8$$

$$7n - 6n = 6n + 8 - 6n$$

$$n = 8$$

- (A) Subtraction Property of Equality
- (B) Multiplication Property of Equality
- (C) Distributive Property
- (D) Zero Product Property

Select all correct answers.

3. Determine which of the following properties are used in the given solution to  $x^2 - 2(2x + 9) = 2x - 2$ .

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

$$x^2 - 4x - 18 = 2x - 2$$

$$x^2 - 4x - 18 + 2 = 2x - 2 + 2$$

$$x^2 - 4x - 16 = 2x$$

$$x^2 - 4x - 16 - 2x = 2x - 2x$$

$$x^2 - 6x - 16 = 0$$

$$(x - 8)(x + 2) = 0$$

$$x - 8 = 0 \text{ or } x + 2 = 0$$

$$x - 8 + 8 = 0 + 8 \text{ or } x + 2 - 2 = 0 - 2$$

$$x = 8$$

$$x = -2$$

- (A) Addition Property of Equality
- (B) Subtraction Property of Equality
- (C) Multiplication Property of Equality
- (D) Division Property of Equality
- (E) Distributive Property
- (F) Zero Product Property

**CONSTRUCTED RESPONSE**

4. Examine the given solution process and identify the property that justifies each lettered step.

$$2\left(\frac{1}{2}x + 4x - 7\right) = 2(2x + 3)$$

a.  $x + 8x - 14 = 4x + 6$

$$x + 8x = 4x + 20$$

b.  $x + 8x - 4x = 4x + 20 - 4x$

$$5x = 20$$

c.  $\frac{5x}{5} = \frac{20}{5}$

$$x = 4$$

5. Dennis is driving down the East Coast of the United States. He starts in Boston, Massachusetts, and drives through Hartford, Connecticut, which is approximately 101 miles away from Boston. He continues on from Hartford to Baltimore, Maryland.

a. Write an equation for the length of Dennis's trip in miles  $D$  in terms of the time in hours  $t$  it takes him to drive from Hartford to Baltimore and the speed he drives in miles per hour  $s$  while traveling from Hartford to Baltimore.

b. Baltimore is approximately 410 miles away from Boston. Determine Dennis's average speed from Hartford to Baltimore if that portion of his trip takes 5 hours. Show your work. Justify each step. (You do not need to include "Simplify" as a justification.)

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6. Martina is standing on the edge of a small cliff with the ocean 70 feet below. She throws a small rock out into the ocean with an initial vertical velocity of 32 feet per second. The height in feet  $h$  of the rock above the water level after  $t$  seconds is modeled by the equation  $h = -16t^2 + 32t + 70$ . Use the equation to determine how long it takes before the rock is 22 feet above the water. Show your work. Justify each step. (You do not need to include "Simplify" and "Factor" as justifications.)

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### A.REI.3

#### SELECTED RESPONSE

Select the correct answer.

1. Let  $a$ ,  $b$ , and  $c$  be constants, and let  $x$  be a variable. Which of the following is equivalent to  $a(x + b) < c$  when  $a < 0$ ?

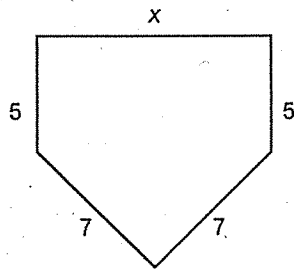
(A)  $x < \frac{c-b}{a}$

(B)  $x > \frac{c-b}{a}$

(C)  $x < \frac{c}{a} - b$

(D)  $x > \frac{c}{a} - b$

2. If the perimeter of the pentagon is 35, which of the following is the value of  $x$ ?



- (A) 8  
 (B) 9  
 (C) 10  
 (D) 11

Select all correct answers.

3. Which of the following inequalities have solution sets that only include positive numbers?

- (A)  $3g - 7 < -2g + 3$   
 (B)  $-5h + 1 < -2h - 17$   
 (C)  $8 < -2k + 12$   
 (D)  $7m + 15 < 8m + 12$   
 (E)  $2n + 7 - 6n < -10n - 11 + 3n$

Select the correct answer for each lettered part.

4. Ernesto and his family have just finished dinner at a restaurant in a region where the meal tax is 5% of the price of the meal. Ernesto leaves a 17% tip. With tax and tip, the total cost is \$58.56. The equation  $58.56 = 0.05p + 0.17p + p$ , where  $p$  is the price of the meal without tax or tip, can be used to model this situation. Determine which of the following could be steps in calculating the price of the meal  $p$ .

- a.  $23p = 58.56$   Yes  No  
 b.  $p + 0.05p = 58.39$   Yes  No  
 c.  $p = \frac{58.56}{1.22}$   Yes  No  
 d.  $p(1.05 + 0.17) = 58.56$   Yes  No  
 e.  $1.22 = \frac{p}{58.56}$   Yes  No

#### CONSTRUCTED RESPONSE

5. Solve  $-4x + 5 \geq -23$ . Show your work.

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6. Solve  $7\left(\frac{-4 - \frac{8}{3}x}{-5}\right) = 28$ . Show your work.

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7. Gwendolyn has already read 130 pages of her 400-page summer reading book. If she reads at an average rate of 45 pages per hour, how long will she need to finish the book? Write and solve an equation to find the answer. Show your work.

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8. Annika is selling art prints at a comic convention. The convention charged her \$50 for her table space, and she is selling her prints at \$2 each. Write an equation to represent the net profit  $P$  Annika makes from selling  $n$  prints, and then determine how many prints she needs to sell if she wants to make \$130. How many prints will she need to sell per day if the convention runs from Friday to Sunday? Show your work.

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9. A competitor in a 2009 hot dog eating contest set a world record for number of hot dogs and buns eaten in 10 minutes. Let  $H$  be the number of hot dogs and buns eaten for the record. Suppose another competitor eats 16 hot dogs in the first 2 minutes of an attempt to at least tie that record. Let  $r$  be the average number of hot dogs and buns this competitor must eat per minute in the remaining time.

a. Write an inequality to represent this situation.

b. The record the first competitor set in 2009 was 68 hot dogs and buns. How many hot dogs and buns would the second competitor have to eat per minute over his remaining time to at least tie that record? Show your work.

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c. If the second competitor maintained his current pace for the entire 10 minutes, would he tie, break, or fall short of the record? Explain.

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## A.REI.4a

### SELECTED RESPONSE

Select the correct answer.

- Which equation shows  $x^2 + 8x + 9 = 0$  after the method of completing the square has been applied?
  - (A)  $(x + 2)^2 = -5$
  - (B)  $(x + 4)^2 = 7$
  - (C)  $(x + 8)^2 = 55$
  - (D)  $x^2 = -(8x + 9)$

- When  $2x^2 - 20x + 49 = 19$  is written in the form  $(x - p)^2 = q$ , what is the value of  $q$ ?

- (A) 19
- (B) 10
- (C) 5
- (D) -30

Select all correct answers.

- Which of the following equations, when rewritten in the form  $(x - p)^2 = q$ , have a value of  $q$  that is a perfect square?

- (A)  $x^2 - 2x + 5 = 13$
- (B)  $x^2 + 8x + 9 = 5$
- (C)  $2x^2 + 12x - 29 = 81$
- (D)  $5x^2 - 20x + 14 = -6$
- (E)  $3x^2 + 36x + 88 = 4$

Select the correct answer for each lettered part.

- Determine whether each given equation has equal values of  $p$  and  $q$  when written in the form  $(x - p)^2 = q$ .
 

a. $x^2 + 6x + 4 = 0$	○ Yes ○ No
b. $x^2 - 8x + 1 = -11$	○ Yes ○ No
c. $2x^2 + 12x + 37 = 13$	○ Yes ○ No
d. $3x^2 - 42x + 127 = 1$	○ Yes ○ No
e. $2x^2 + 8x - 5 = -9$	○ Yes ○ No

### CONSTRUCTED RESPONSE

- Rewrite  $x^2 + 14x + 13 = 0$  in the form  $(x - p)^2 = q$  by completing the square. Show your work.

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- Rewrite  $4x^2 - 16x - 21 = 12$  in the form  $(x - p)^2 = q$  by completing the square. Show your work.

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7. How many real solutions does  $3x^2 + 18x + 77 = 2$  have? Justify your answer by rewriting the equation in the form  $(x - p)^2 = q$ .

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8. Derive the quadratic formula from  $ax^2 + bx + c = 0$  by completing the square.

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9. A catapult set atop a hill overlooking an enemy castle fires a boulder at that castle. The equation that represents the height  $h$  in feet of the boulder above the ground the castle is built on is  $h = -16t^2 + 64t + 217$ , where  $t$  is the time in seconds after the boulder is launched.

a. Rewrite the equation in the form  $(x - p)^2 = q$  for the case where a boulder strikes the castle wall 25 feet above the ground. Show your work.

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b. How long is the boulder in part a in the air? Show your work.

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c. If the boulder has an initial horizontal velocity of 95 feet per second, how far away from the castle wall is the catapult? Show your work.

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## A.REI.4b

### SELECTED RESPONSE

Select the correct answer.

- Which of the following quadratic equations has no real solutions?
  - (A)  $3x^2 + 12x + 12 = 0$
  - (B)  $3x^2 - 3x - 18 = 0$
  - (C)  $3x^2 + 2x + 1 = 0$
  - (D)  $3x^2 - 3 = 0$
- When the quadratic formula is applied to  $2x^2 + 3x - 4 = 0$ , what is the numerator of the simplified answer?
  - (A)  $3 \pm \sqrt{41}$
  - (B)  $-3 \pm \sqrt{41}$
  - (C)  $3 \pm \sqrt{38}$
  - (D)  $-3 \pm \sqrt{-23}$

Select all correct answers.

- Which of the following quadratic equations have two distinct, real solutions?
  - (A)  $x^2 = 36$
  - (B)  $x^2 - 78 = 0$
  - (C)  $x^2 - 8x + 16 = 0$
  - (D)  $3x^2 - 6x = 29$
  - (E)  $5x^2 - 4x + 3 = 0$

Select the correct answer for each lettered part.

- Determine the number of distinct, real solutions for each given equation.
 

a. $x^2 + 25 = 10x$	<input type="radio"/> Zero	<input type="radio"/> One	<input type="radio"/> Two
b. $x^2 + 3x + 9 = 5$	<input type="radio"/> Zero	<input type="radio"/> One	<input type="radio"/> Two
c. $x^2 + x = 72$	<input type="radio"/> Zero	<input type="radio"/> One	<input type="radio"/> Two
d. $3x^2 + 36x + 121 = 13$	<input type="radio"/> Zero	<input type="radio"/> One	<input type="radio"/> Two
e. $2x^2 - 16 = -7x - 1$	<input type="radio"/> Zero	<input type="radio"/> One	<input type="radio"/> Two

### CONSTRUCTED RESPONSE

- Solve the quadratic equation  $x^2 - 11x + 24 = 0$  by factoring. Show your work.

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- Solve the quadratic equation  $x^2 - 22x = -57$  by any method. Show your work.

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- For what values of  $b$  does the equation  $5x^2 + bx + 12 = 0$  have no real solutions? Justify your answer.

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8. A batter makes contact with a baseball 3 feet above the plate and the ball flies with a vertical velocity of 96 feet per second. It eventually lands in outfield bleacher seats 25 feet above the ground. This is modeled by the equation  $25 - 3 = -16t^2 + 96t$ .

- a. Determine the flight time of the ball by completing the square. Round to two decimal places as needed. Explain why you chose the answer you did.

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- b. If the horizontal velocity of the baseball from part a is 80 feet per second, how far away from the batter does the ball land? Round to the nearest whole foot.

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9. A rectangular box has a surface area of 670 square inches. The width is 3 inches greater than the height, and the length is 3 inches less than twice the height. Solve the resulting quadratic equation and then find the three dimensions and the volume of the box. Show your work.

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## A.REI.5

### SELECTED RESPONSE

Select the correct answer.

1. Which of the following systems of equations has the same solution as the given system?

$$\begin{cases} -2x + 2y = -2 \\ 3x - y = 9 \end{cases}$$

(A)  $\begin{cases} 4x = 16 \\ 3x - y = 9 \end{cases}$

(B)  $\begin{cases} -2x + 2y = -2 \\ 6x - 2y = 9 \end{cases}$

(C)  $\begin{cases} -3x - 7y = 3 \\ 3x - y = 9 \end{cases}$

(D)  $\begin{cases} -2x + 2y = -2 \\ x + y = 11 \end{cases}$

Select all correct answers.

2. The solution to the system of equations  $x + y = 1$  and  $x - y = -7$  is  $(-3, 4)$ . This solution is NOT a solution to which of the following equations?

(A)  $x + y - 2(x - y) = 1 - 2(-7)$

(B)  $3(x + y) + x - y = 3(1) - 7$

(C)  $x + y + 5(x - y) = 5(1) - 7$

(D)  $-4(x + y) + x - y = 1 - 4(-7)$

(E)  $x + y - x + y = 1 + 7$

### CONSTRUCTED RESPONSE

3. Write an equation that is the sum of the first equation and three times the second equation. Combine all like terms on both sides of the equation.

$$\begin{cases} 2x - 3y = 7 \\ 4x + y = -7 \end{cases}$$

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4. The solution to the system of equations  $2x + y = 5$  and  $x + 3y = -5$  is  $(4, -3)$ .

- a. Write an equation that is the sum of  $2x + y = 5$  and  $-2$  times  $x + 3y = -5$ . Combine all like terms on both sides of the equation.

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- b. Without solving, how do you know that the system of equations consisting of  $x + 3y = -5$  and your answer from part a has the same solution as the original system?

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5. The solution to the following system of equations is  $(5, -2)$ .

$$\begin{cases} 2x + 3y = 4 \\ x + y = 3 \end{cases}$$

- a. Find the sum of the first equation and twice the second equation. Combine all like terms on both sides of the equation.

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- b. Verify that the given solution is a solution to your equation from part a.

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6. For variables  $x$  and  $y$  and constants  $P$ ,  $Q$ ,  $R$ ,  $S$ ,  $T$ ,  $U$ , and  $v$ , prove that the solution  $(x_0, y_0)$  to the system of equations

$$\begin{cases} Px + Qy = R \\ Sx + Ty = U \end{cases}$$

is also a solution to the system of equations shown below.

$$\begin{cases} Px + Qy = R \\ (P + vS)x + (Q + vT)y = R + vU \end{cases}$$

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7. The solution to the system of equations

$$\begin{cases} 3x + 2y = 5 \\ 2x - 3y = 12 \end{cases}$$

is  $(3, -2)$ . Find the difference between four times the first equation and three times the second equation. Show your work. Then show that  $(3, -2)$  is a solution to the system of equations composed of the first original equation and this new equation.

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8. The solution to the following system of equations is  $(-2, 3)$ .

$$\begin{cases} 4x + 3y = 1 \\ x - y = -5 \end{cases}$$

- a. Find a system of equations with the same solution by replacing the first equation with the sum of the first equation and three times the second equation.

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- b. Find another system of equations with the same solution by replacing the first equation with the sum of the first equation and  $-4$  times the second equation.

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- c. Show that your answers from parts a and b are equivalent systems. (Hint: Can you transform the system from part a into the system from part b by combining equations?)

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## A.REI.6

### SELECTED RESPONSE

Select the correct answer.

1. In which quadrant is the solution to this system of equations?

$$\begin{cases} 2x + 5y = 1 \\ 3x - 4y = 13 \end{cases}$$

- (A) Quadrant I  
 (B) Quadrant II  
 (C) Quadrant III  
 (D) Quadrant IV

Select all correct answers.

2. Which of the following systems of equations has a solution in which the x-value is greater than the y-value?

(A)  $\begin{cases} x + 3y = -1 \\ 5x + 4y = 6 \end{cases}$

(B)  $\begin{cases} 3x + 2y = -19 \\ -2x - 3y = 21 \end{cases}$

(C)  $\begin{cases} 6x - y = -10 \\ -2x - 2y = -6 \end{cases}$

(D)  $\begin{cases} 3x + 5y = 16 \\ 4x - y = 6 \end{cases}$

(E)  $\begin{cases} 5x - 2y = 12 \\ -10x + 4y = -20 \end{cases}$

Select the correct answer for each lettered part.

3. Determine the number of solutions for each system of equations.

a.  $\begin{cases} 2x - y = 1 \\ x + 5y = 6 \end{cases}$        Zero     One     Infinitely many

b.  $\begin{cases} 2x + 3y = 12 \\ 4x + 6y = 24 \end{cases}$        Zero     One     Infinitely many

c.  $\begin{cases} -x + 4y = -17 \\ 2x - 3y = 6 \end{cases}$        Zero     One     Infinitely many

d.  $\begin{cases} 5x + 8y = 6 \\ -3x - 4y = -4 \end{cases}$        Zero     One     Infinitely many

e.  $\begin{cases} 4x - 6y = 15 \\ -6x + 9y = 12 \end{cases}$        Zero     One     Infinitely many

### CONSTRUCTED RESPONSE

4. Solve the given system of equations algebraically. Show your work.

$$\begin{cases} 5x - 2y = 4 \\ 3x - 4y = -6 \end{cases}$$

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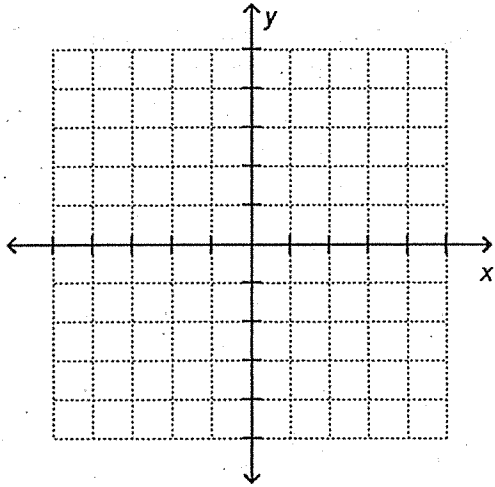


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5. Graph  $3x + 2y = 7$  and  $2x - 5y = -25$  and use the graph to estimate the solution to the system of equations.



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6. Shawntae has 21 coins, all of them nickels and dimes, that are worth \$1.70.

a. Write a system of equations to describe the situation.

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b. Solve the system. Show your work.

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c. How many nickels and how many dimes does Shawntae have?

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7. Madeline is selling sketches for \$2 and color prints for \$5 at a comic convention. Madeline leaves the table and asks her friend Chris to run the table for her. She returns to find Chris has made \$93. Chris doesn't know how many of each item he sold, but he remembers that he sold a total of 30 sketches and colored prints. Below is Madeline's work in determining how many of each item was sold.

$s$  = number of sketches  
 $p$  = number of colored prints

$$s + p = 30$$

$$s = 30 - p$$

$$2s + 5p = 93$$

$$2(30 - p) + 5p = 93$$

$$60 - p + 5p = 93$$

$$60 + 4p = 93$$

$$4p = 33$$

$$p = 8.25$$

a. As Madeline was writing " $p = 8.25$ ," she realized she had made a mistake. How did she know?

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b. Explain Madeline's mistake.

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c. How many of each item did Chris sell? Show your work.

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## A.REI.7

### SELECTED RESPONSE

Select the correct answer.

1. What is the distance between the points of intersection of the graphs of  $y = x^2$  and  $y = 6 - x$ ?
  - (A)  $\sqrt{26}$
  - (B)  $5\sqrt{2}$
  - (C)  $2\sqrt{37}$
  - (D)  $\sqrt{170}$
  
2. How many times do the graphs of  $y = -x^2 + 5x + 6$  and  $2x + y = 16$  intersect?
  - (A) 0
  - (B) 1
  - (C) 2
  - (D) 3

Select all correct answers.

3. Which of the following systems of equations have at least one solution in Quadrant I?
  - (A)  $\begin{cases} -4x + 3y = 1 \\ y = x^2 - x + 1 \end{cases}$
  - (B)  $\begin{cases} x - 3y = 2 \\ y = x^2 + 2x - 34 \end{cases}$
  - (C)  $\begin{cases} 3x + y = -2 \\ y = x^2 - 2x - 4 \end{cases}$
  - (D)  $\begin{cases} 2x + y = -1 \\ y = -x^2 - 6x - 5 \end{cases}$
  - (E)  $\begin{cases} x + y = 3 \\ y = x^2 - 8x + 16 \end{cases}$

### CONSTRUCTED RESPONSE

4. Find all the points of intersection between the line  $2x + y = 4$  and the ellipse

$$\frac{x^2}{4} + \frac{y^2}{16} = 1. \text{ Show your work.}$$

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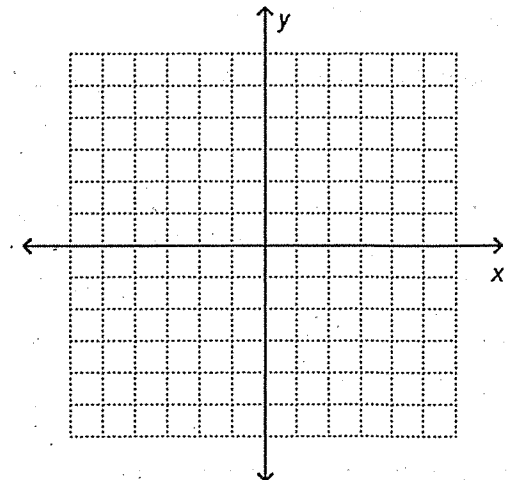
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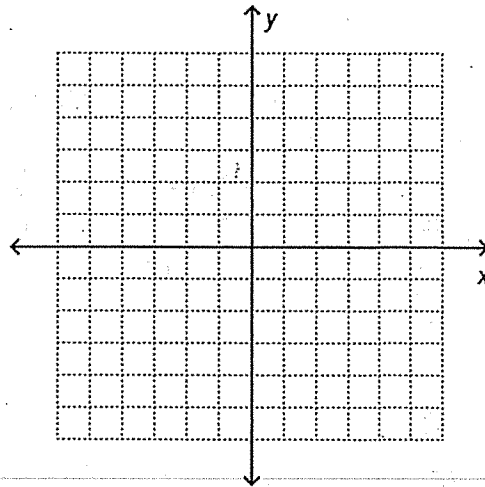
5. Graph the following system of equations and then solve the system graphically.

$$\begin{cases} 2x + y = -12 \\ y = x^2 - 5 \end{cases}$$



6. Graph the following system of equations and then solve the system graphically.

$$\begin{cases} -5x + y = 5 \\ x - y^2 = -1 \end{cases}$$



7. Terrell was asked to find the solution(s) of the system of equations  $\begin{cases} y = -2x - 5 \\ y = x^2 + 4x - 21 \end{cases}$

His work and graph are shown. Once Terrell graphed the system of equations to check his answer, he knew he had made a mistake somewhere. State how Terrell knew he made a mistake, identify the mistake, and find the correct solution(s) of the system of equations. Show your work.

$$x^2 + 4x - 21 = -2x - 5$$

$$x^2 + 6x - 16 = 0$$

$$x = \frac{-6 + \sqrt{36 - 4(1)(-16)}}{2}$$

$$= \frac{-6 + \sqrt{100}}{2}$$

$$= \frac{-6 + 10}{2}$$

$$= 2$$

$$y = -2(2) - 5 = -9$$

The solution of the system of equations is  $(2, -9)$ .

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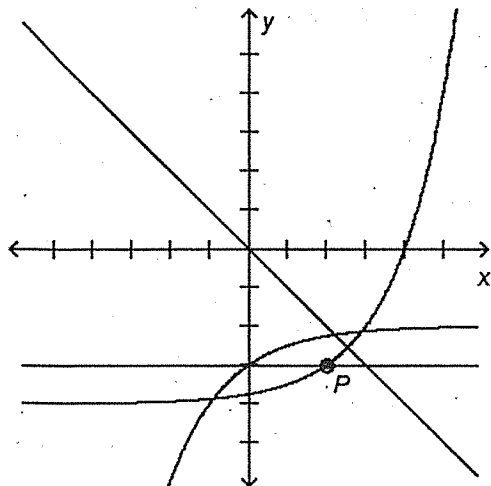
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# A.REI.10

## SELECTED RESPONSE

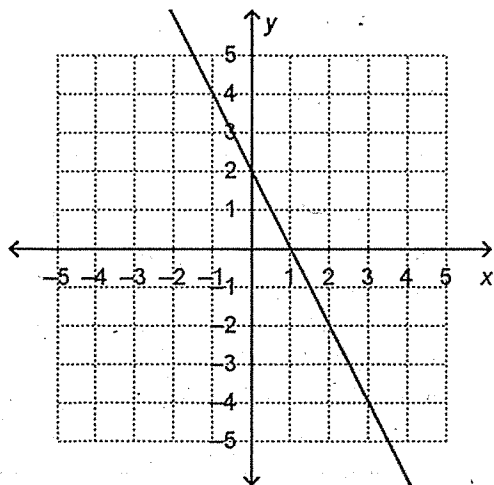
Select the correct answer.

1. How many of the equations graphed below have  $P$  as a solution?



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

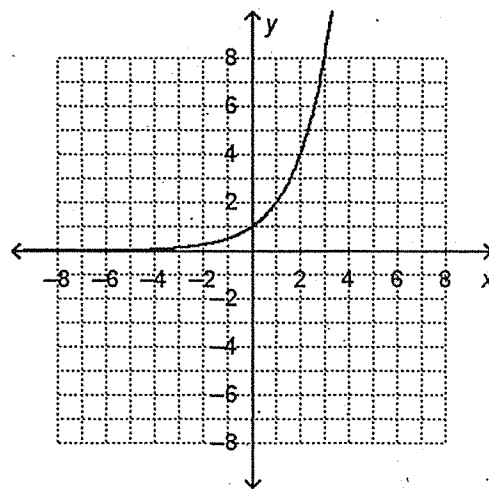
2. Which of the following is NOT a solution of the equation represented by the graph?



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

Select all correct answers.

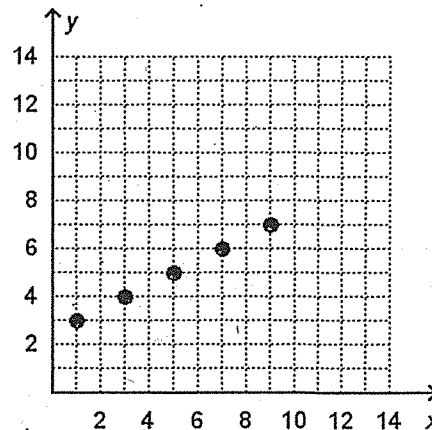
3. Which of the following are solutions of the equation represented by the graph?



- (A) (-4, 1)
- (B) (-1, 2)
- (C) (0, 1)
- (D) (1, 0)
- (E) (2, 4)
- (F) (3, 8)

## CONSTRUCTED RESPONSE

4. A linear equation has a graph that goes through the points shown below and extends infinitely in both directions. Is (13, 9) a solution of this equation? Justify your answer.




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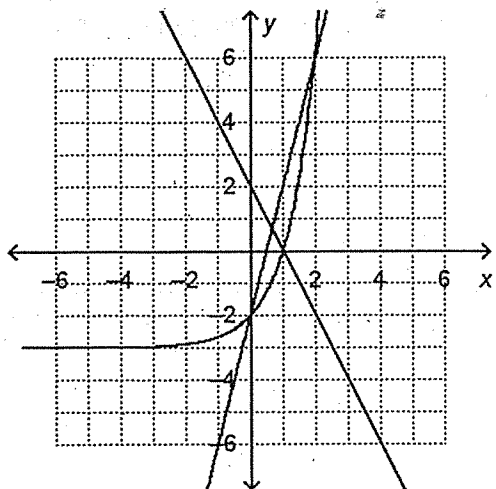


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5. Based on the graph, Bryce says that  $(1, 0)$  is the solution of  $y = 3^x - 3$  and  $-4x + y = -2$  because their graphs intersect at that point.



- a. Identify Bryce's error.

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- b. What two graphs actually intersect at  $(1, 0)$ ?

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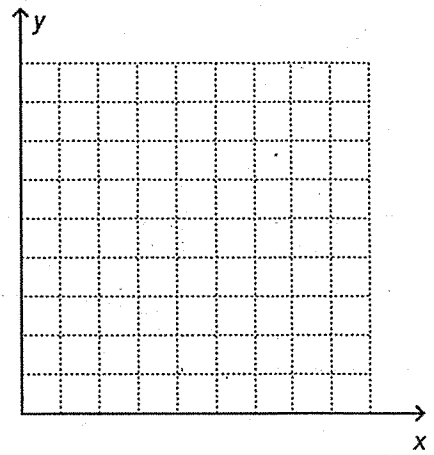
- c. Use the graph to find the solution(s) of  $y = 3^x - 3$  and  $-4x + y = -2$ .

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6. Maryse went for a bike ride. She rode at a constant speed, and she traveled 7 miles in one hour. Maryse wrote the equation  $y = 7x$  to model her bike ride, where  $x$  is the time Maryse spent riding, and  $y$  is the distance she traveled.

- a. Graph Maryse's equation.



- b. Maryse uses her equation to estimate that she rode 14 miles in the first 2 hours of her trip. Did she use her equation correctly? Use your graph to explain why or why not.

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- c. Maryse uses her equation to predict that she would travel 40 miles if she rode for four hours. Did she use her equation correctly? Use your graph to explain why or why not.

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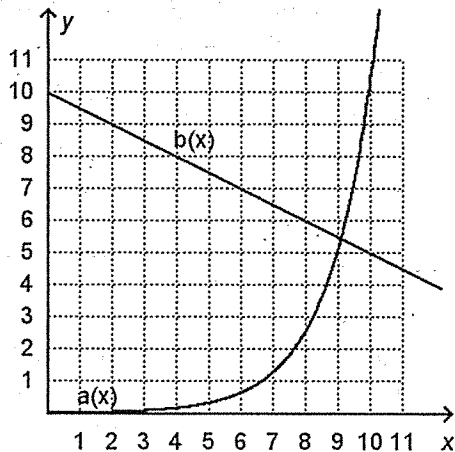


### A.REI.11\*

#### SELECTED RESPONSE

Select the correct answer.

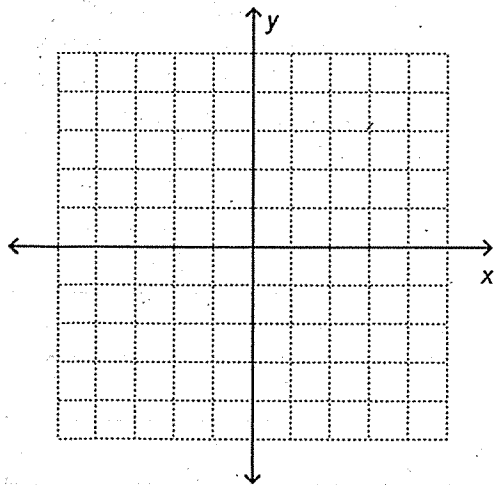
1. Which of the following is the best approximation of the solution of the equation  $a(x) = b(x)$ ?



- (A)  $x = 0$
- (B)  $x = 5.5$
- (C)  $x = 9$
- (D)  $x = 10$

#### CONSTRUCTED RESPONSE

2. Graph the equations  $y = 2^x$  and  $y = 4x$ . Use the graph to estimate the solution(s) of the equation  $2^x = 4x$ .



3. a. Complete the table of values below.

$x$	$4x + 8$	$7x - 11$
5		
5.5		
6		
6.5		
7		
7.5		

- b. Use the table to determine an approximate solution of  $4x + 8 = 7x - 11$ . Justify why your solution is the best approximation given in the table.

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4. Why are the  $x$ -coordinates of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect the solutions of the equation  $f(x) = g(x)$ ?

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5. Chris deposits \$1200 into a bank account that pays 1.5% interest compounded annually. At the same time, Karla deposits \$1250 into a bank account that earns 0.9% interest compounded annually. Neither Chris nor Karla withdraws money from or deposits more money into his or her account.

- a. Write functions  $c(t)$  and  $k(t)$  that represent the amount of money in Chris's account and the amount of money in Karla's account, respectively, after  $t$  years.

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- b. Complete the table of values for each account. Round all values to the nearest cent.

Year	Chris's Account	Karla's Account
3		
4		
5		
6		
7		
8		

- c. Which row in the table represents the best approximation of the intersection of the graphs of  $c(t)$  and  $k(t)$ ? Explain how you know.

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6. The hare has challenged the tortoise to a race. The hare offers the tortoise a 435-meter head start. The race path is 500 meters long, and the tortoise moves at a rate of 5 meters per minute. The hare knows that he moves at a rate 30 times as fast as the tortoise.

- a. Write functions  $g(t)$  and  $h(t)$  that represent the distance  $d$ , in meters, the tortoise and the hare, respectively, have traveled  $t$  minutes after the hare begins running.

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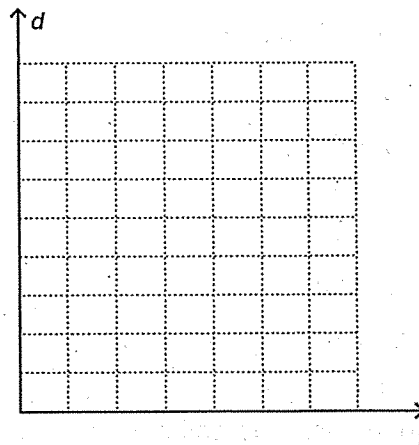


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- b. Graph the two equations from part a.



- c. Does the hare pass the tortoise before the race is over? If so, when, and how far have they both run at that time? Answer using the graph from part b.

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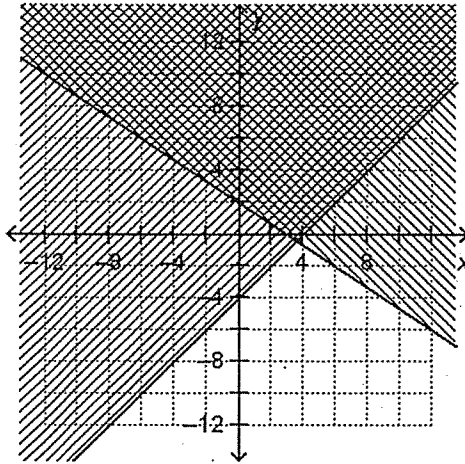


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**A.REI.12****SELECTED RESPONSE**

Select the correct answer.

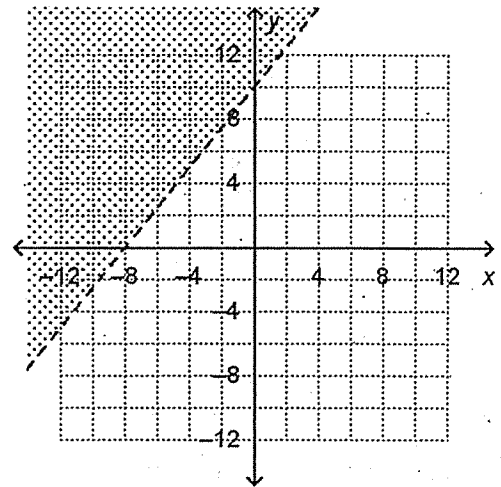
1. Describe the graph that represents the solutions of the inequality  $y < 5x + 12$ .
- (A) All of the points that lie above the line  $y = 5x + 12$
- (B) All of the points that lie on and above the line  $y = 5x + 12$
- (C) All of the points that lie below the line  $y = 5x + 12$
- (D) All of the points that lie on and below the line  $y = 5x + 12$
2. Which of the following systems represents the graph shown?



- (A)  $\begin{cases} 2x + 3y < 6 \\ -x + y > -4 \end{cases}$
- (B)  $\begin{cases} 2x + 3y \geq 6 \\ -x + y \geq -4 \end{cases}$
- (C)  $\begin{cases} x + y \geq 4 \\ 2x - 3y \leq 6 \end{cases}$
- (D)  $\begin{cases} x + y > 4 \\ 2x - 3y < 6 \end{cases}$

Select all correct answers.

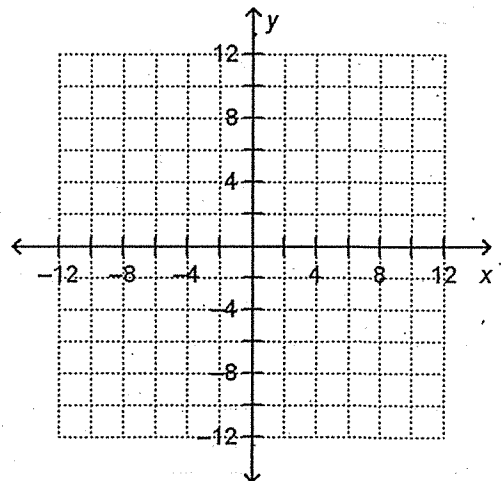
3. Which of the following inequalities have the solutions shown on the graph?



- (A)  $5x - 4y < -40$
- (B)  $5x + 4y > 40$
- (C)  $y \geq \frac{5}{4}x + 10$
- (D)  $y > \frac{5}{4}x + 10$
- (E)  $-10x + 8y \leq 80$
- (F)  $-10x + 8y > 80$

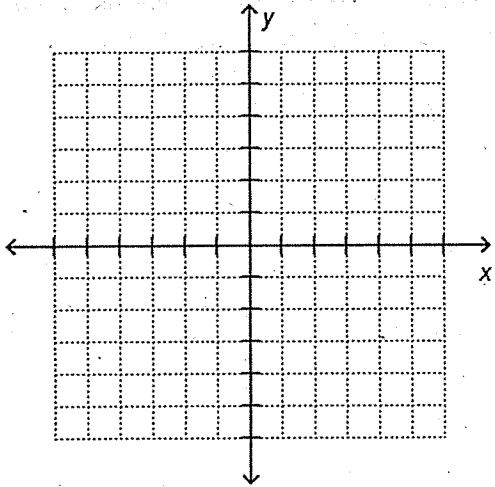
**CONSTRUCTED RESPONSE**

4. Graph the solutions of the inequality  $3x - 6y \leq 30$ .



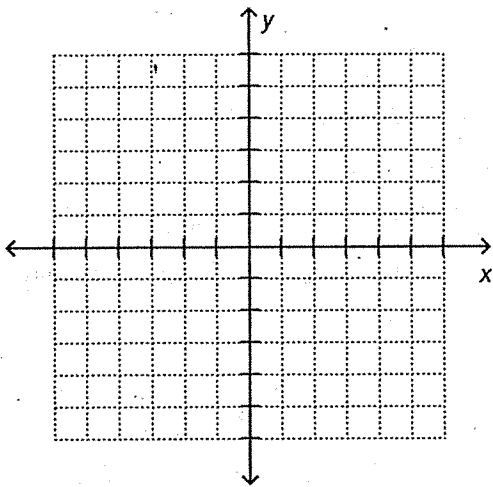
5. Graph the solution set of the system.

$$\begin{cases} 8x + 5y > 40 \\ -6x + 2y \geq -18 \end{cases}$$



6. Graph the solutions for each inequality in the system given below. Describe the solution set of the system.

$$\begin{cases} 6x + 8y \geq 24 \\ -3x - 4y \geq 18 \end{cases}$$




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7. A company provides bus trips to various events for  $a$  adults and  $c$  children. The company charges \$15 for each adult and \$8 for each child for a trip to an upcoming play. The bus has a maximum capacity of 40 people, and the company needs to earn a minimum of \$400 from this event to make a profit.

a. Write a system of inequalities that represents this situation.

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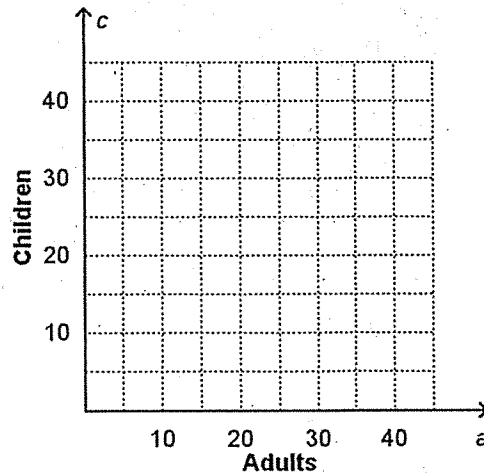
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b. Graph the system of inequalities from part a.



c. 20 adults and 15 children are going to the play. Can the bus hold that many people and does the company make a profit? Explain by using the graph from part b.

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