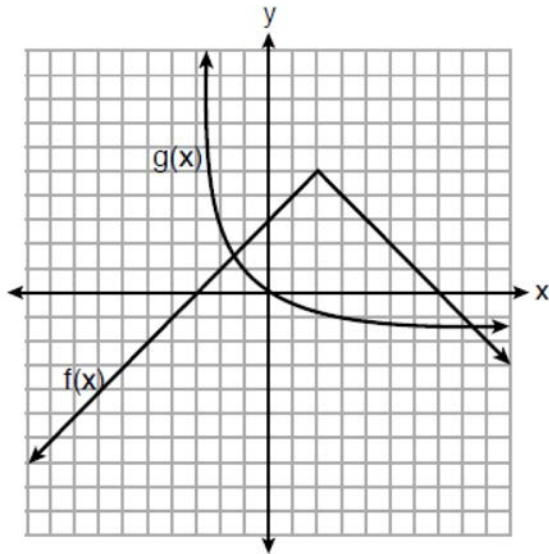


**A.REI.D.11: Other Systems 1**

- 1 The functions  $f(x)$  and  $g(x)$  are graphed below.



Based on the graph, the solutions to the equation  $f(x) = g(x)$  are

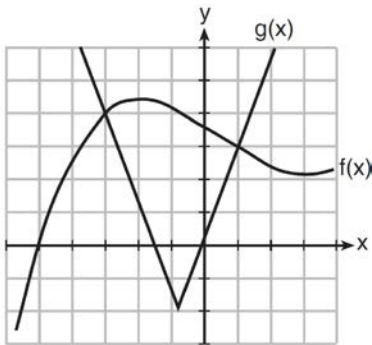
- 1) the  $x$ -intercepts
  - 2) the  $y$ -intercepts
  - 3) the  $x$ -values of the points of intersection
  - 4) the  $y$ -values of the points of intersection
- 2 Two functions,  $y = |x - 3|$  and  $3x + 3y = 27$ , are graphed on the same set of axes. Which statement is true about the solution to the system of equations?
- 1)  $(3, 0)$  is the solution to the system because it satisfies the equation  $y = |x - 3|$ .
  - 2)  $(9, 0)$  is the solution to the system because it satisfies the equation  $3x + 3y = 27$ .
  - 3)  $(6, 3)$  is the solution to the system because it satisfies both equations.
  - 4)  $(3, 0)$ ,  $(9, 0)$ , and  $(6, 3)$  are the solutions to the system of equations because they all satisfy at least one of the equations.

- 3 The graphs of the functions  $f(x) = |x - 3| + 1$  and  $g(x) = 2x + 1$  are drawn. Which statement about these functions is true?
- 1) The solution to  $f(x) = g(x)$  is 3.
  - 2) The solution to  $f(x) = g(x)$  is 1.
  - 3) The graphs intersect when  $y = 1$ .
  - 4) The graphs intersect when  $x = 3$ .
- 4 Which value of  $x$  results in equal outputs for  $j(x) = 3x - 2$  and  $b(x) = |x + 2|$ ?
- 1)  $-2$
  - 2)  $2$
  - 3)  $\frac{2}{3}$
  - 4)  $4$
- 5 Given the functions  $h(x) = \frac{1}{2}x + 3$  and  $j(x) = |x|$ , which value of  $x$  makes  $h(x) = j(x)$ ?
- 1)  $-2$
  - 2)  $2$
  - 3)  $3$
  - 4)  $-6$
- 6 What is the total number of points of intersection for the graphs of the equations  $y = x^2$  and  $y = -x^2$ ?
- 1) 1
  - 2) 2
  - 3) 3
  - 4) 0
- 7 What is one solution of the accompanying system of equations?
- $$y = -x^2 + 5$$
- $$y = -0.5x^2 + 3$$
- 1)  $(3, 5)$
  - 2)  $(0, 5)$
  - 3)  $(-2, 1)$
  - 4)  $(0, 3)$

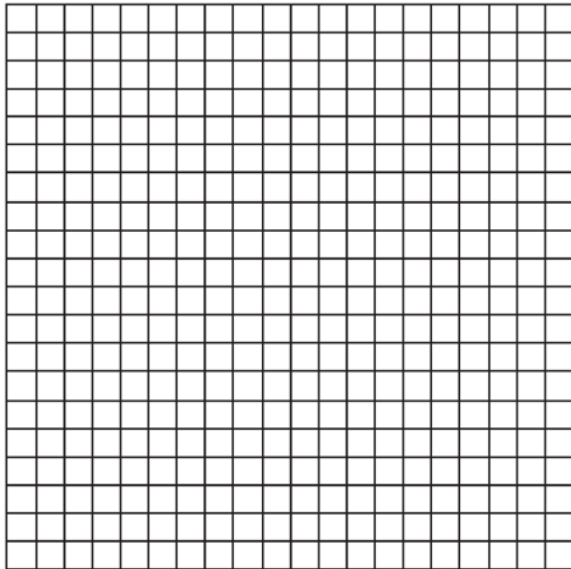
8 Which pair of equations would have  $(-1, 2)$  as a solution?

- 1)  $y = x + 3$  and  $y = 2^x$
- 2)  $y = x - 1$  and  $y = 2x$
- 3)  $y = x^2 - 3x - 2$  and  $y = 4x + 6$
- 4)  $2x + 3y = -4$  and  $y = -\frac{1}{2}x - \frac{3}{2}$

9 The graph below shows two functions,  $f(x)$  and  $g(x)$ . State all the values of  $x$  for which  $f(x) = g(x)$ .



10 Graph  $f(x) = |x|$  and  $g(x) = -x^2 + 6$  on the grid below. Does  $f(-2) = g(-2)$ ? Use your graph to explain why or why not.

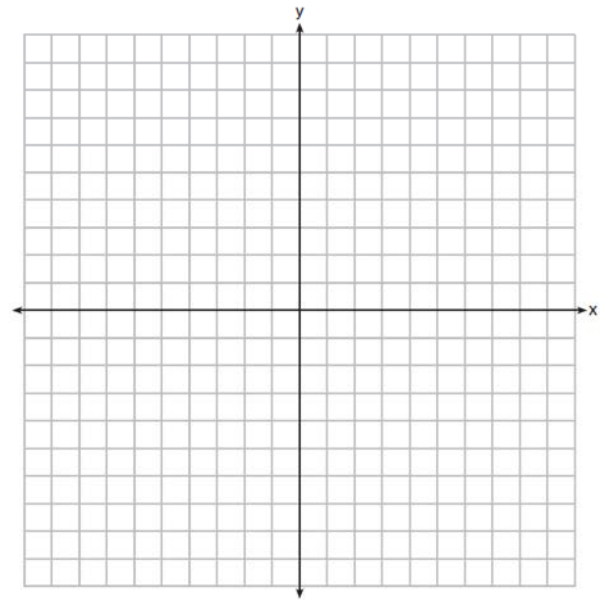


11 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

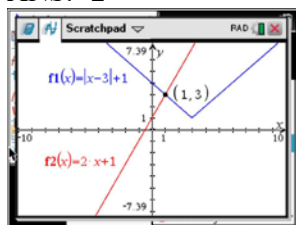
$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of  $x$  satisfy the equation  $f(x) = g(x)$ ? Explain your answer, using evidence from your graphs.

**A.REI.D.11: Other Systems 1**  
**Answer Section**

- 1 ANS: 3 REF: 081819ai  
 2 ANS: 3 REF: 011518ai  
 3 ANS: 2



$$\begin{aligned}
 |x-3| + 1 &= 2x + 1 & x-3 &= 2x & x-3 &= -2x \\
 |x-3| &= 2x & -3 &= x & 3x &= 3 \\
 & & & & \text{extraneous} & x = 1
 \end{aligned}$$

REF: 061622ai

- 4 ANS: 2  
 $|x+2| = 3x-2$   
 $x+2 = 3x-2$   
 $4 = 2x$   
 $x = 2$

REF: 081702ai

- 5 ANS: 1  
 $\frac{1}{2}x + 3 = |x|$     $-\frac{1}{2}x - 3 = x$   
 $\frac{1}{2}x + 3 = x$     $-x - 6 = 2x$   
 $x + 6 = 2x$     $-6 = 3x$   
 $6 = x$     $-2 = x$

REF: 011617ai

- 6 ANS: 1

$x^2 = -x^2$   
 $2x^2 = 0$     $(0, 0)$   
 $x = 0$

Intersection  $x=0$   $y=0$

X	Y <sub>1</sub>	Y <sub>2</sub>
-3	9	-9
-2	4	-4
-1	1	-1
0	0	0
1	1	-1
2	4	-4
3	9	-9

X=0

REF: 080611b

7 ANS: 3

$$-x^2 + 5 = -0.5x^2 + 3$$

$$-0.5x^2 = -2$$

$$x^2 = 4$$

$$x = \pm 2$$

REF: 060706b

8 ANS: 3

$$y = (-1)^2 - 3(-1) - 2 = 2, y = 4(-1) + 6 = 2$$

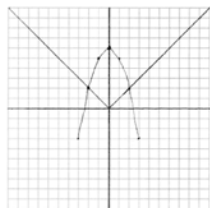
REF: 011918ai

9 ANS:

-3,1

REF: 081630ai

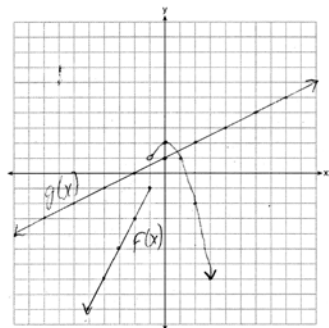
10 ANS:



Yes, because the graph of  $f(x)$  intersects the graph of  $g(x)$  at  $x = -2$ .

REF: 011733ai

11 ANS:



1, because the graphs only intersect once.

REF: 061636ai