Date Completed: _____
Mentor Initials: _____

A mentor can change everything.

Nonlinear Systems of Equations

Multiple Choice

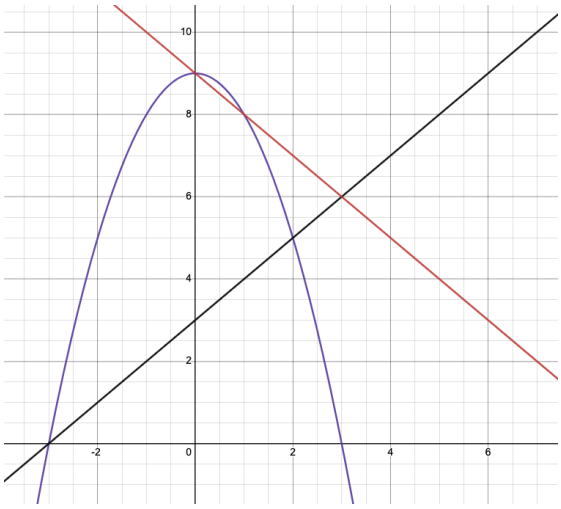
1.

$$x^2 - 6x + 10 = y$$
$$x = y + 2$$

When the system of equations shown above is graphed in the xy-plane, which of the following is a y coordinate of an intersection point (x, y) of the graphs of the two equations? **(NO CALCULATOR)**

A) -3
B) -1
C) 1
D) 3

2.



A system of three equations is shown above. How many solutions does this system have?

A) None
B) One
C) Two
D) Three

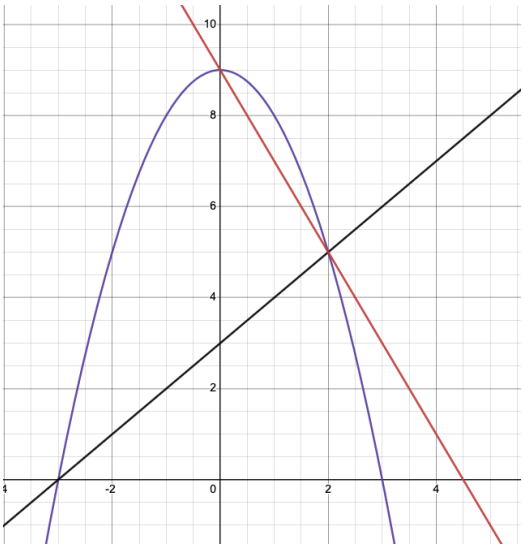
3.

$$x^2 + y = 11$$
$$x - y = 19$$

Which of the following is a *y*-coordinate of a solution to the system of equations shown above?

A) -14
B) -6
C) -5
D) 5

4.



A system of three equations is shown above. How many solutions does this system have?

A) None
B) One
C) Two
D) Three

5.

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

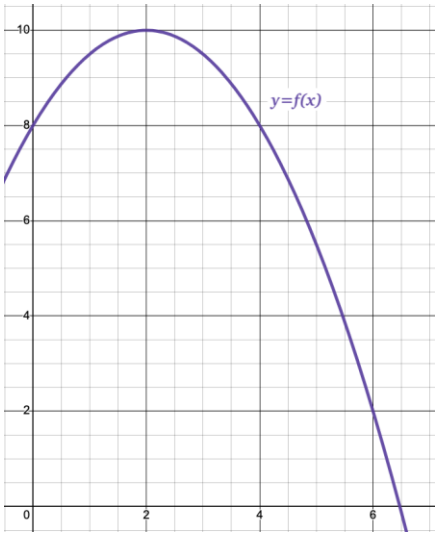
If (x_1, y_1) and (x_2, y_2) are solutions to the system of equations above, what are the values of x_1 and x_2?

A) $-2\sqrt{5}$ and $2\sqrt{5}$
B) $-3\sqrt{2}$ and $3\sqrt{2}$
C) -3 and 3
D) -4 and 4

Grid-In

6. In the xy-plane, the graph of the equation $y = 12x - 11$ intersects the graph of the equation $y = x^2$ at exactly two points. What is the sum of the x-coordinates of the two points?
(NO CALCULATOR)

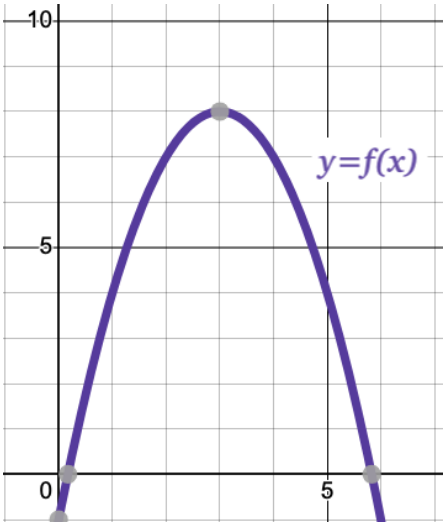
7.



The graph of the function f, defined by $f(x) = -\frac{1}{2}(x-2)^2 + 10$, is shown in the xy-plane above. If the function g (not shown) is defined by $g(x) = -x + 8$, what is one possible value of a such that $f(a) = g(a)$? **(NO CALCULATOR)**

8. In the xy-plane, a line with the equation $y = c$ for some constant c has exactly one point of intersection with a parabola. If the parabola has the equation $y = -x^2 + 8x$, what is the value of c?

9.



The graph of the function f, defined by $f(x) = -(x-3)^2 + 8$ is shown in the xy-plane above. If the function g (not shown) is defined by $g(x) = -\frac{4}{5}x + 8$, what is one possible value of a such that $f(a) = g(a)$? **(NO CALCULATOR)**

10. In the xy-plane, there is a parabola with the equation $y = x^2 - 7x + c^2$. For what value of c will this parabola intersect with a line with the equation $y = 0$ at exactly one point?