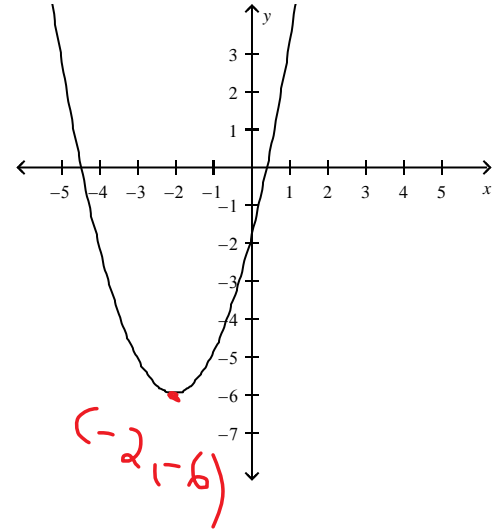


10 Part I: Multiple Choice. Place the correct answer in the corresponding blank at the end of this section.

1. Which set of data is correct for this graph?

Set	Axis of Symmetry	Vertex	Domain	Range
A	$x = -2$	$(-2, 6)$	$x \in \mathbb{R}$	$y \in \mathbb{R}$
B	$x = -6$	$(-6, -2)$	$-8 \leq x \leq 4$	$-8 \leq y$
C	$x = -2$	$(-2, -6)$	$x \in \mathbb{R}$	$-6 \leq y$
D	$x = 2$	$(2, 6)$	$-6 \leq x \leq 2$	$-6 \leq y$



- (A) Set A
- (B) Set B
- (C) Set C**
- (D) Set D

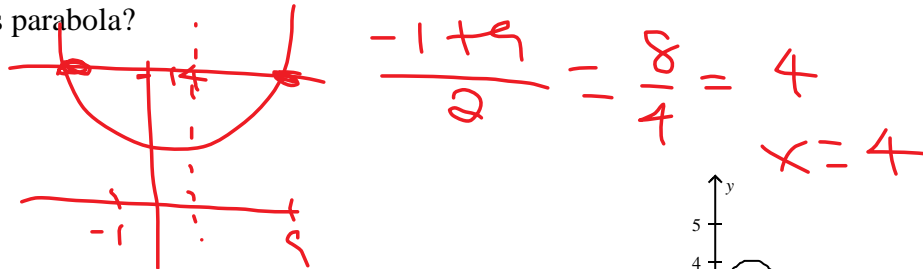
2. What is the y-intercept for the function $f(x) = x^2 - 2x - 8$?

- (A) $(0, -8)$**
- (B) $(0, -2)$
- (C) $(0, -1)$
- (D) $(0, 1)$

$(0, -8)$

3. The points $(-1, 14)$ and $(9, 14)$ are located on the same parabola. What is the equation for the axis of symmetry for this parabola?

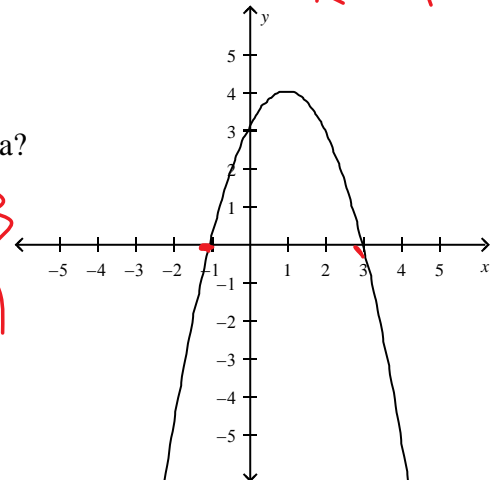
- (A) $x = -4.5$
- (B) $x = 4$**
- (C) $x = 5$
- (D) $x = 7$



4. What is the correct quadratic function for this parabola?

- (A) $f(x) = (x + 1)(x + 3)$
- (B) $f(x) = (1 - x)(3 - x)$
- (C) $f(x) = (x - 1)(x + 3)$
- (D) $f(x) = -(x + 1)(x - 3)$**

$x = -1, x = 3$
 $(x + 1)(x - 3)$



5. Which set of data is correct for the quadratic relation $f(x) = -3(x + 2)(x - 3)$?

	x-intercepts	y-intercept	Axis of Symmetry	Vertex
A	(2, 0), (3, 0)	$y = -18$	$x = 2.5$	(2.5, 6.75)
B	(-2, 0), (3, 0)	$y = -18$	$x = -0.5$	(-0.5, 15.75)
C	(2, 0), (-3, 0)	$y = 18$	$x = -0.5$	(-0.5, 15.75)
D	(-2, 0), (3, 0)	$y = 18$	$x = 0.5$	(0.5, 18.75)

- (A) Set A
 (B) Set B
 (C) Set C
 (D) Set D

$$\frac{-2 + 3}{2} = \frac{1}{2} = 0.5 \quad x = 0.5$$

6. Which set of data is correct for the quadratic relation $f(x) = (x + 45)^2 + 60$?

$$(-45, 60)$$

	Direction parabola opens	Vertex	Axis of Symmetry
A	upward	(-60, -45)	$x = -60$
B	downward	(60, 45)	$x = 60$
C	upward	(-45, 60)	$x = -45$
D	downward	(45, 60)	$x = 45$

- (A) Set A
 (B) Set B
 (C) Set C
 (D) Set D

7. What is the y-intercept for the function $f(x) = 3(x - 2)^2 - 4$?

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

$$\begin{aligned} x &= 0 \\ &= 3(0 - 2)^2 - 4 \\ &= 3(4) - 4 \\ &= 12 - 4 \\ &= 8 \\ &(0, 8) \end{aligned}$$

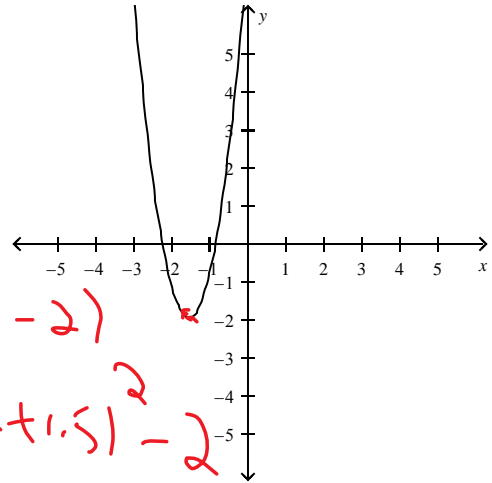
8. Which function has a minimum value?

- (A) $f(x) = -(x - 15)^2 + 5$
 (B) $f(x) = (x - 5)^2 + 15$
 (C) $f(x) = -(x + 1)^2 - 5$
 (D) $f(x) = -(x - 5)^2 + 10$

$$\begin{aligned} a < 0 & \text{ (downward arrow)} \\ a > 0 & \text{ (upward arrow)} \end{aligned}$$

9. Which quadratic function represents this parabola?

- (A) $f(x) = 4(x + 1.5)^2 - 2$
- ~~(B) $f(x) = -4(x + 1.5)^2 + 2$~~
- ~~(C) $f(x) = 4(x + 1.5)^2 + 2$~~
- ~~(D) $f(x) = 4(x - 1.5)^2 - 2$~~

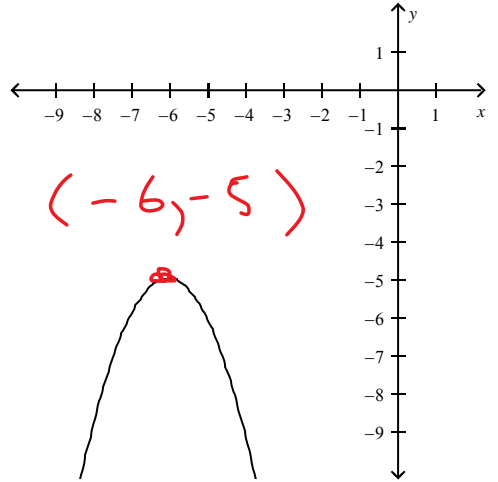


Handwritten red notes: $(-1.5, -2)$ and $y = a(x + 1.5)^2 - 2$

10. Which quadratic function defines this parabola in vertex form?

- (A) $y = -(x + 5)^2 - 6$
- (B) $y = -(x + 4)^2 - 5$
- (C) $y = -(x + 6)^2 - 5$
- (D) $y = -(x + 6)^2 - 4$

Handwritten red notes: $y = a(x + 6)^2 - 5$ and $(-6, -5)$



Answers to multiple choice.

1. ____ 2. ____ 3. ____ 4. ____ 5. ____
6. ____ 7. ____ 8. ____ 9. ____ 10. ____

20 **Part II: Constructed Response. Answer each question in the space provided. Show all workings.**

5 11. Fill in the table for the relation $y = x^2 - x + 7$.

y-intercept	$(0, 7)$
Axis of symmetry	$x = 0.5$
Vertex	$(0.5, 6.75)$
Domain	$\{x \mid x \in \mathbb{R}\}$
Range	$\{y \mid y \geq 6.75, y \in \mathbb{R}\}$

Handwritten red work:

$$a < 0 \Rightarrow k = \frac{-b}{2a} = \frac{-(-1)}{2(1)} = 0.5$$

$$k = (0.5)^2 - (0.5) + 7 = 6.75$$

$a > 0$ with two upward-pointing arrows.

3

12. A quadratic function has an equation that can be written in the form $f(x) = a(x - r)(x - s)$. The graph of the function has x -intercepts at $(1, 0)$ and $(3, 0)$ and passes through the point $(-1, 16)$. Write the equation of the function.

$$16 = a(-1 - 1)(-1 - 3) \quad \vee \quad y = 2(x - 1)(x - 3)$$

$$16 = a(-2)(-4)$$

$$\frac{16}{8} = \frac{8a}{8}$$

$$a = 2$$

- 4 13. Sketch the graph of the relation $y = (x - 2)(x - 4)$. Include vertex, x -intercepts, y -intercepts.

$$x\text{-int: } (2, 0), (4, 0)$$

$$y\text{-int: } x = 0$$

$$y = (0 - 2)(0 - 4)$$

$$= (-2)(-4)$$

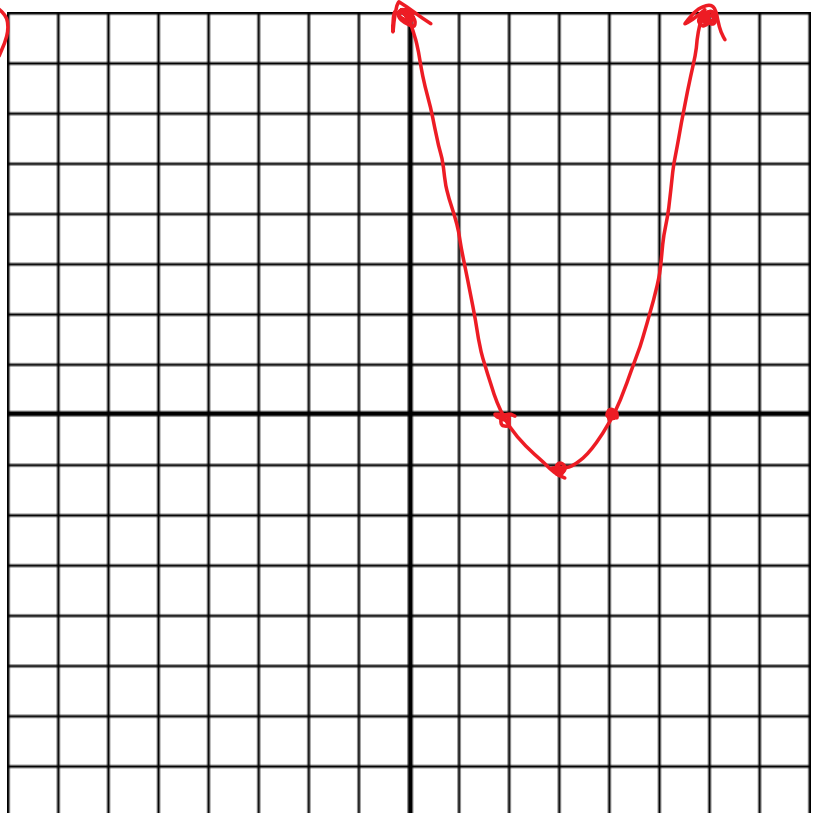
$$(0, 8)$$

$$h = \frac{2 + 4}{2} = \frac{6}{2} = 3$$

$$k = (3 - 2)(3 - 4)$$

$$= (1)(-1)$$

$$= -1 \text{ vertex } (3, -1)$$



- 4 14. Determine the equation of a parabola with vertex $(-2, -11)$ and point $(-4, 5)$.

$$y = a(x-h)^2 + k$$

$$5 = a(-4+2)^2 - 11$$

$$5 = a(-2)^2 - 11$$

$$5 = 4a - 11$$

$$5 + 11 = 4a$$

$$\frac{16}{4} = \frac{4a}{4}$$

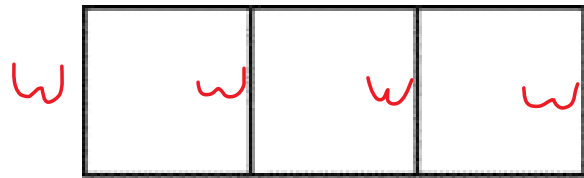
$$a = 4$$

$$y = 4(x+2)^2 - 11$$

- 4 15. Rosa is building three enclosed gardens as shown. She bought 200 m of fencing for the gardens. Algebraically determine the maximum total area of the garden and the dimensions that give this area.

$$2l + 4w = 200$$

$$A = l \cdot w$$



$$\frac{2l}{2} = \frac{-4w + 200}{2}$$

$$l = -2w + 100$$

$$A = (-2w + 100)w$$

$$A = -2w^2 + 100w$$

$$w_v = \frac{-b}{2a} = \frac{-100}{2(-2)} = \frac{-100}{-4} = 25$$

$$\text{width} = 25 \text{ m}$$

$$l = -2(25) + 100 = 50 \text{ m}$$

$$A = (25)(50) = 1250 \text{ m}^2$$