

Part 1 - Multiple Choice

- c 1. Which description of a graph appears to represent a quadratic relation?
- a line straight up and down
 - an ellipse
 - a parabola opening up
 - a parabola opening to the right

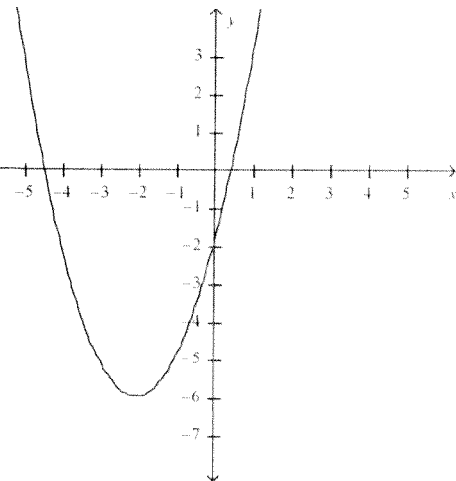
- a 2. Which relation is quadratic?
- $y = x^2 + 10x + 23$
 - $y = 4x + 2$
 - $y = 2x^3 + x^2$
 - $y = -4x + 3$

- a 3. What is the y-intercept for $y = 3x^2 + 2x - 5$?
- 5
 - 5
 - 2
 - 3

- d 4. Which parabola opens upward?
- $y = 2x - 4x^2 - 5$
 - $y = 2 + 4x - 5x^2$
 - $y = 4 - 2x^2 - 5x$
 - $y = -5x + 4x^2 + 2$

- c 5. Which set of data is correct for this graph?

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



- Set A
- Set B
- Set C
- Set D

- d 6. What are the x-intercepts for the function $f(x) = x^2 - 2x - 3$? $(x-3)(x+1)$
- $x = -3, x = 1$
 - no x-intercepts
 - $x = 0, x = 3$
 - $x = -1, x = 3$

- b 7. What are the x- and y-intercepts for the function $f(x) = x^2 - 2x - 8$? $(x-4)(x+2)$
- no x-intercepts, $y = 8$
 - $x = -2, x = 4, y = -8$
 - $x = -2, x = 2, y = -8$
 - $x = -2, x = 4, y = 8$

- B 8. The points $(-2, 4)$ and $(1, 4)$ are located on the same parabola. What is the equation for the axis of symmetry for this parabola?
- $x = -1.5$
 - $x = -0.5$
 - $x = 0.5$
 - $x = -1$
- $\frac{-2+1}{2}$

- d 9. What is the correct factored form of the quadratic $f(x) = x^2 - 5x + 6$? $(x-3)(x-2)$
- $f(x) = (x + 2)(x + 3)$
 - $f(x) = (x - 2)(x + 3)$
 - $f(x) = (x + 2)(x - 3)$
 - $f(x) = (x - 2)(x - 3)$

C

10. Which set of data is correct for the quadratic relation $f(x) = (x + 2)(x + 4)$?

	x-intercepts	y-intercept	Axis of Symmetry	Vertex
A.	(2, 0), (4, 0)	$y = 8$	$x = 4$	(4, 48)
B.	(-2, 0), (-4, 0)	$y = -8$	$x = -4$	(-4, 0)
C.	(-2, 0), (-4, 0)	$y = 8$	$x = -3$	(-3, -1)
D.	(2, 0), (4, 0)	$y = 8$	$x = 3$	(3, 35)

- a. Set A
- b. Set B
- c. Set C
- d. Set D

B

11. Which relation is the factored form of $f(x) = x^2 + 8x - 9$?

$(x+9)(x-1)$

- a. $f(x) = (x + 1)(x - 9)$
- b. $f(x) = (x - 1)(x + 9)$
- c. $f(x) = (x - 1)(x - 9)$
- d. $f(x) = (x + 1)(x + 9)$

a

12. For the quadratic equation, $y = x^2 - 6x + 1$, what is the vertex?

- a. (3, -8)
- b. (-3, 28)
- c. (3, 1)
- d. (-3, 1)

$-\frac{b}{2a} \Rightarrow \frac{-(-6)}{2(1)} = 3$

B

13. For the quadratic equation, $y = x^2 - 8x + 1$, what is the equation of the axis of symmetry?

- a. $x = -4$
- b. $x = 4$
- c. $x = -8$
- d. $x = 8$

$x = -\frac{b}{2a}$

B

14. For the graph of: $y = (x - 3)(x + 5)$, what is the equation of the axis of symmetry?

- a. $x = -3$
- b. $x = -1$
- c. $x = 3$
- d. $x = 5$

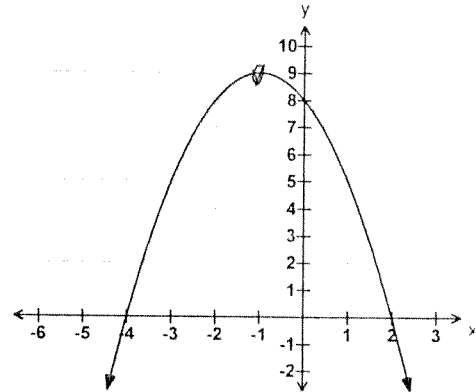
$x = 3, x = -5$

$\frac{3 + (-5)}{2} = -\frac{2}{2}$

C

15. What is the range of the quadratic function graphed to the right?

- a. $\{y | y \geq 9, y \in R\}$
- b. $\{y | y \leq -1, y \in R\}$
- c. $\{y | y \leq 9, y \in R\}$
- d. $\{y | y \geq -1, y \in R\}$



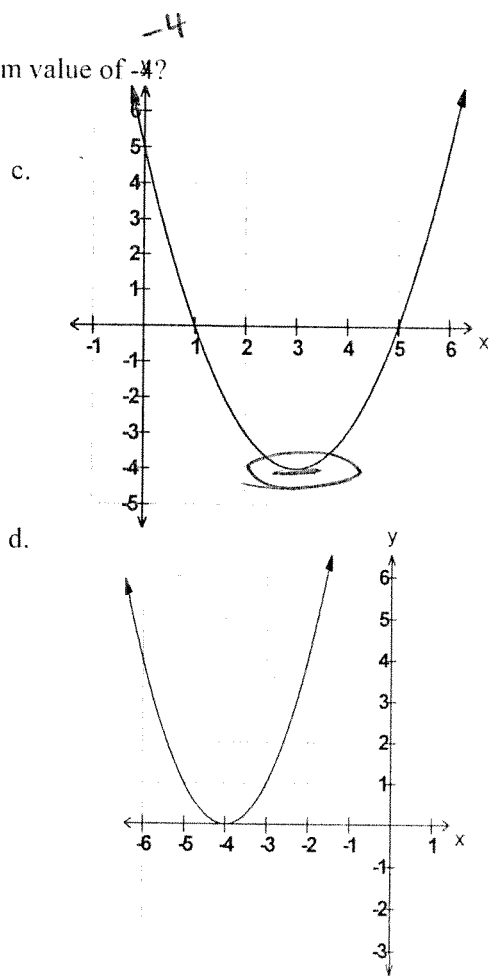
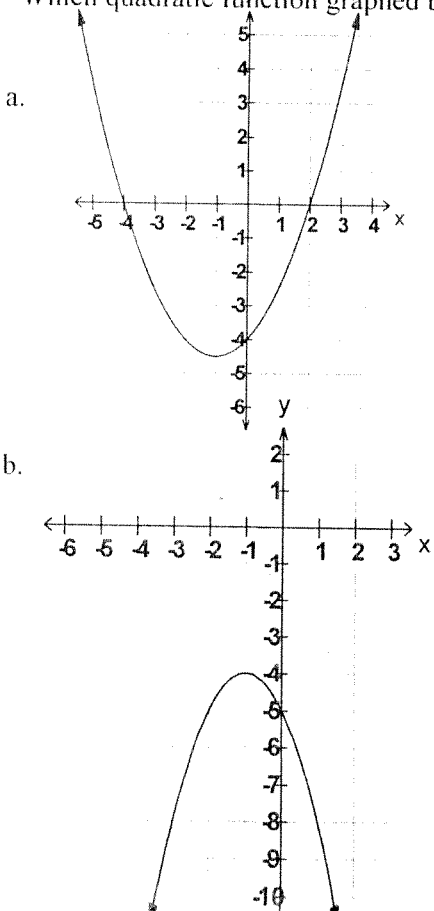
B

16. What is the y-intercept of the quadratic function graphed above?

- a. $y = -4$
- b. $y = 8$
- c. $y = 2$
- d. $y = -8$

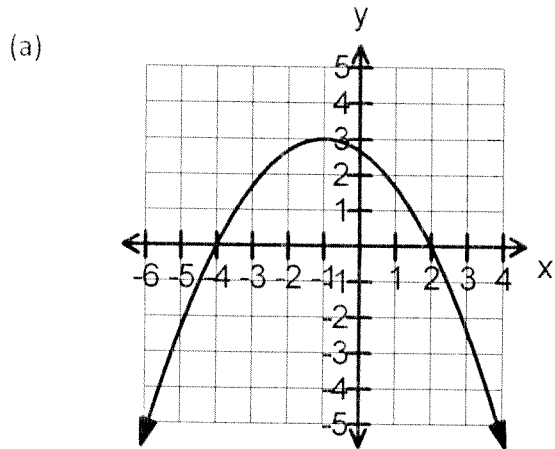
C

17. Which quadratic function graphed below has a minimum value of -4?



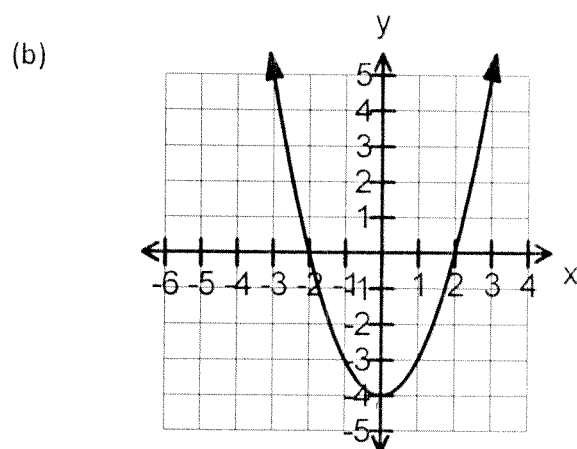
Part II:

1. Write the domain and range for each parabola below:



Domain: $x \in \mathbb{R}$

Range: $y | y \leq 3$



Domain: $x \in \mathbb{R}$

Range: $y | y \geq -4$

2. Complete the following chart.

$y = -2(x + 1)^2 - 5$	$y = 3(x - 2)^2 + 4$
a) Vertex = <u>$(-1, -5)$</u>	a) Vertex = <u>$(2, 4)$</u>
b) Axis of symmetry: <u>$x = -1$</u>	b) Axis of symmetry: <u>$x = 2$</u>
c) Range: <u>$y y \leq -5$</u>	c) Range: <u>$y y \geq 4$</u>
d) Direction of opening: <u>Down</u>	d) Direction of opening: <u>up</u>
e) Maximum or minimum: <u>Max(-5)</u>	e) Maximum or minimum: <u>Min(4)</u>

3. Write the equation of the quadratic function, in **vertex form**, $y = a(x - h)^2 + k$, given the following information:

Vertex at (3, -4) and passing through the point (1, -2)

$$y = a(x - 3)^2 - 4$$

$$-2 = a(1 - 3)^2 - 4$$

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

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

$$-2 + 4 = 4a$$

$$2 = 4a$$

$$a = \frac{1}{2}$$

$$y = \frac{1}{2}(x - 3)^2 - 4$$

4. Write the equation of the quadratic function, in **factored form**, $y = a(x - r)(x - s)$, given the following information:

x-intercepts at (-1, 0) and (5, 0) and passing through the point (-3, 4)

$$y = a(x + 1)(x - 5)$$

$$4 = a(-3 + 1)(-3 - 5)$$

$$4 = a[(-2)(-8)]$$

$$4 = 16a$$

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

$$\frac{1}{4} = a$$

$$y = \frac{1}{4}(x + 1)(x - 5)$$

5. For the following equation in **factored form**, state the x-intercepts, the y-intercept, and the equation of the axis of symmetry: $y = 2(x - 1)(x + 3)$

$$x\text{-int} = x = 1, x = -3$$

$$y\text{-int} = y = 2(0-1)(0+3)$$

$$y = 2[(-1)(3)]$$

$$y = 2(-3)$$

$$y = -6$$

Axis of Sym

$$\frac{1+(-3)}{2} = \frac{-2}{2} = -1$$

$$x = -1$$

6. Sketch the graph of the following quadratic function: $f(x) = -3(x - 1)^2 + 1$

$$\text{Vertex} = (1, 1)$$

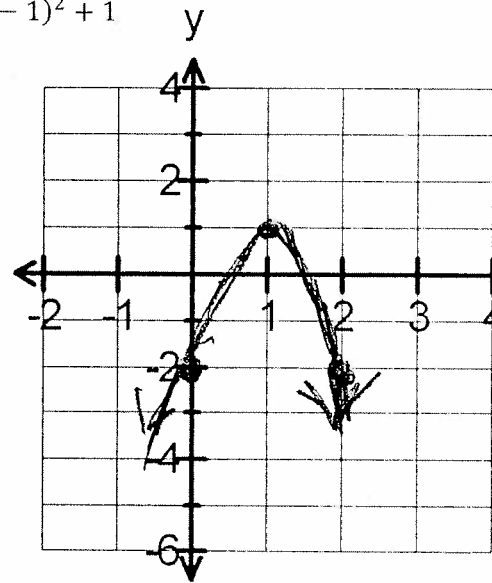
Opens Down: (-3)

$$y\text{-int} \rightarrow y = -3(0-1)^2 + 1$$

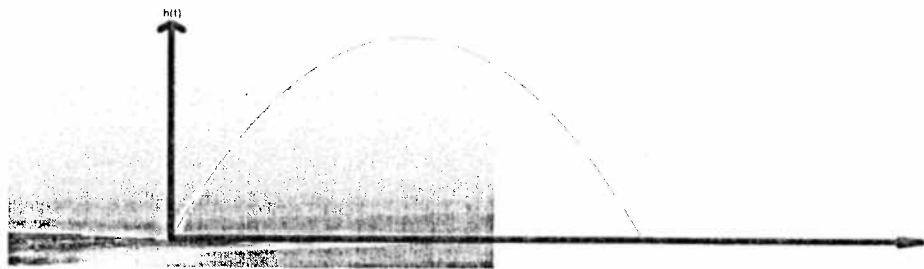
$$y = -3(1) + 1$$

$$y = -2$$

$$(0, -2)$$



~~7. A missile fired from ground level attains a maximum height of 180 m at 3 seconds. The missile is in the air for 6 seconds~~



Determine the **quadratic function** that models the height of the missile over time.