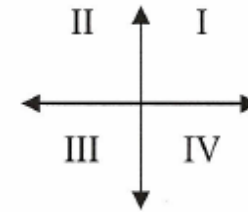


SOLUTIONS

1. Which **quadrant** is the vertex of  $(y + 3) = (x - 2)^2$  located in?  
 a) I      b) II      c) III      **d) IV**

Vertex:  
 $(2, -3) \Rightarrow$  QUADRANT IV



2. Which **quadrant** is the vertex of  $\frac{1}{3}(y - 2) = (x + 3)^2$  located in?  
 a) I      **b) II**      c) III      d) IV

Vertex:  
 $(-3, 2) \Rightarrow$  QUADRANT II

3. Rewrite the following equation in standard form:  $-4(y - 1) = x^2$   
 a)  $y = -4x^2 + 1$       **b)  $y = -\frac{1}{4}x^2 + 1$**       c)  $y = 4x^2 - 1$       d)  $y = \frac{1}{4}x^2 + 1$

$$-4(y - 1) = x^2 \text{ (TF)}$$

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

$$y = -\frac{1}{4}x^2 + 1 \text{ (SF)}$$

4. Rewrite the following equation in transformational form:  $y = \frac{1}{3}(x-2)^2 + 1$

a)  $3(y-1) = (x-2)^2$     b)  $\frac{1}{3}(y+1) = (x-2)^2$     c)  $\frac{1}{3}(y-1) = (x+2)^2$     d)  $3(y+2) = (x-1)^2$

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

$3(y-1) = (x-2)^2$  (TF)

5. Rewrite the following equation in general form:  $y = 2(x-1)^2 + 3$

a)  $y = 2x^2 - 2x + 5$     b)  $y = 2x^2 + 5$     c)  $y = 2x^2 - 3$     d)  $y = 2x^2 - 4x + 5$

$y = 2(x-1)^2 + 3$  (SF)

$y = 2(x-1)(x-1) + 3$

$y = (2x-2)(x-1) + 3$

$y = 2x^2 - 2x - 2x + 2 + 3$

$y = 2x^2 - 4x + 5$  (GF)

6. Where is the axis of symmetry located in the following parabola:  $2(y-1) = (x-3)^2$

a)  $x = 2$     b)  $x = 1$     c)  $x = 3$     d)  $y = 1$

Vertex:  $(3, 1)$   
Axis of Symmetry:  $x = 3$

7. What would be the range of the following quadratic function:  $-2(y-1) = (x+1)^2$  Vertex:  $(-1, 1)$

a)  $\{y \mid y \geq -2, y \in \mathbb{R}\}$     b)  $\{x \mid x \leq -1, x \in \mathbb{R}\}$     c)  $\{y \mid y \leq 1, y \in \mathbb{R}\}$     d)  $\{x \mid x \geq 1, x \in \mathbb{R}\}$  Range:  $\{y \mid y \leq 1, y \in \mathbb{R}\}$

\* Opens Downward.

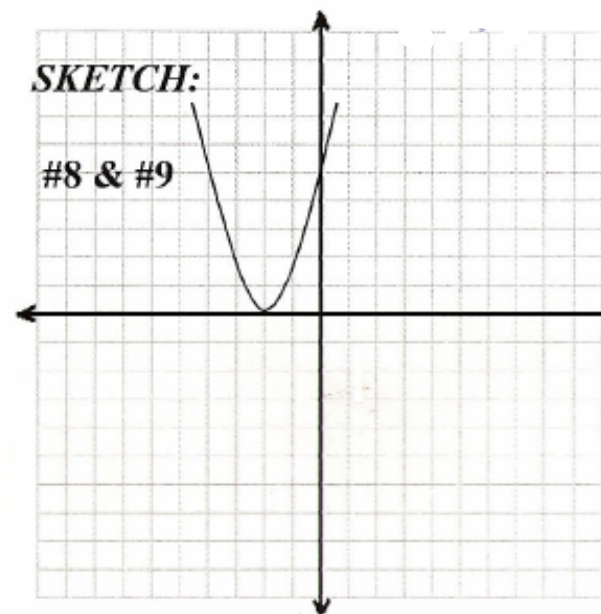
8. Given this graph and its equation:  $\frac{1}{a}(y - k) = (x - h)^2$

What would happen if "h" was changes? The graph would:

- a) move sideways
- b) move up or down
- c) be reflected in the x-axis
- d) be stretched

9. What would happen if "k" was changed? The graph would:

- a) move sideways
- b) move up or down
- c) be reflected in the x-axis
- d) be stretched

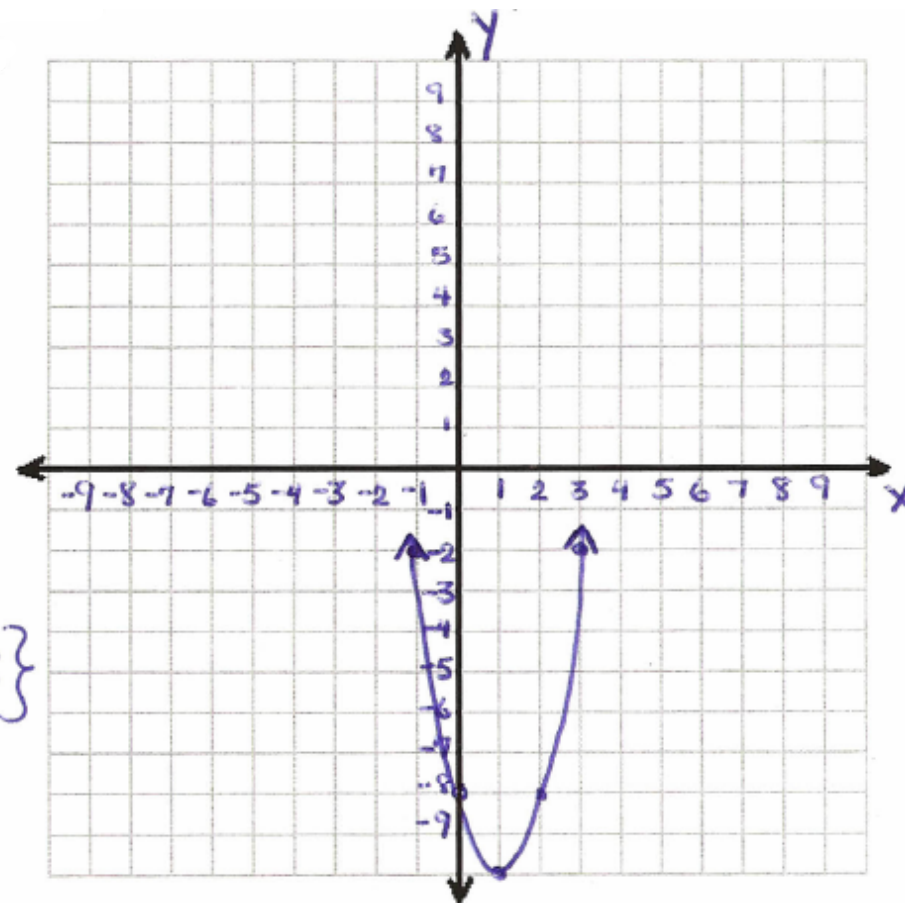


10. Sketch the graph of:  $y = 2(x - 1)^2 - 10$

x	y
-2	8
-1	-2
0	-8
1	-10
2	-8
3	-2

What is the Domain?  $\{x | x \in \mathbb{R}\}$

What is the Range?  $\{y | y \geq -10, y \in \mathbb{R}\}$



11. The x-intercepts of a parabola are (2, 0) and (10, 0). Which of the following points could be the vertex?

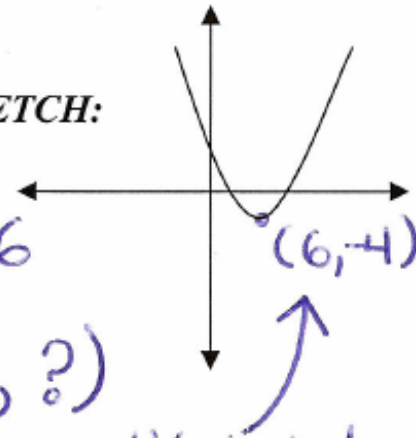
- a) (12, 0)    **b) (6, -4)**    c) (6, 4)    d) (8, -4)

\* Since the vertex will be half way in between the x-intercepts:

Average of x-values:  $\frac{2+10}{2} = \frac{12}{2} = 6$

$\Rightarrow$  Vertex: (6, ?)

SKETCH:



\*\* 2 possible solutions  $\rightarrow$  check sketch!

12. The x-intercepts of a parabola are (-3, 0) and (11, 0). Which of the following points could be the vertex?

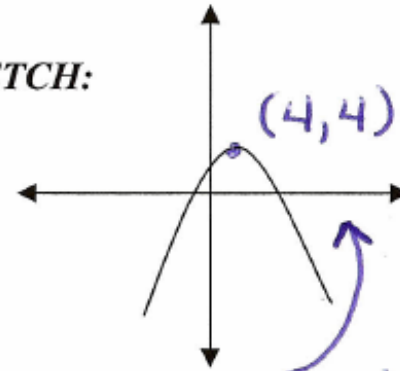
- a) (8, -4)    b) (7, 3)    **c) (4, 4)**    d) (4, -4)

Average of x-values:

$$\frac{-3+11}{2} = \frac{8}{2} = 4$$

$\Rightarrow$  Vertex: (4, ?)

SKETCH:



\* 2 possible solutions  $\rightarrow$  check sketch!

13. Rewrite the following equation in transformational form:  $y = 3(x-1)^2 + 2$

- a)  $(y+2) = 3(x-1)^2$    b)  $\frac{1}{3}(y-2) = (x-1)^2$    c)  $3(y-2) = \frac{1}{3}(x-1)^2$    d)  $3y-2 = (x-1)^2$

$$y = 3(x-1)^2 + 2 \text{ (SF)}$$

$$y-2 = 3(x-1)^2$$

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

14. Rewrite the following equation in transformational form:  $y = 3x^2 - 12x + 5$

- a)  $\frac{1}{3}(y+7) = (x-2)^2$    b)  $3(y-7) = (x-2)^2$    c)  $-\frac{1}{3}(y-7) = (x+2)^2$    d)  $3(y+2) = (x-7)^2$

$$y = 3x^2 - 12x + 5 \text{ (GF)}$$

$$y-5 = 3x^2 - 12x$$

$$y-5 = 3(x^2 - 4x)$$

$$y-5+12 = 3(x^2 - 4x + 4)$$

$$y+7 = 3(x-2)^2$$

$$\frac{1}{3}(y+7) = (x-2)^2 \text{ (TF)}$$

15. Place the following functions in both standard and transformational form:

a)  $y = x^2 + 12x + 40$     b)  $y = -2x^2 + 8x - 10$

$$\begin{aligned}
 y - 40 &= x^2 + 12x & y + 10 &= -2x^2 + 8x \\
 y - 40 + 36 &= (x^2 + 12x + 36) & y + 10 &= -2(x^2 - 4x) \\
 y - 4 &= (x + 6)^2 & y + 10 - 8 &= -2(x^2 - 4x + 4) \\
 & & y + 2 &= -2(x - 2)^2 \\
 \text{(SF)} \quad y &= (x + 6)^2 + 4 & \text{(SF)} \quad y &= -2(x - 2)^2 - 2 \\
 \text{(TF)} \quad (y - 4) &= (x + 6)^2 & \text{(TF)} \quad \frac{1}{2}(y + 2) &= (x - 2)^2
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } y &= 3x^2 + 12x & \text{d) } y &= -2x^2 + 14x - \frac{1}{2} \\
 y &= 3(x^2 + 4x) & y + \frac{1}{2} &= -2x^2 + 14x \\
 y + 12 &= 3(x^2 + 4x + 4) & y + \frac{1}{2} &= -2(x^2 - 7x) \\
 y + 12 &= 3(x + 2)^2 & y + \frac{1}{2} - \frac{98}{4} &= -2(x^2 - 7x + \frac{49}{4}) \\
 \text{(SF)} \quad y &= 3(x + 2)^2 - 12 & y + \frac{2}{4} - \frac{98}{4} &= -2(x - \frac{7}{2})^2 \\
 \text{(TF)} \quad \frac{1}{3}(y + 12) &= (x + 2)^2 & y - \frac{96}{4} &= -2(x - \frac{7}{2})^2 \\
 & & \text{(SF)} \quad y &= -2(x - \frac{7}{2})^2 + 24 \\
 & & \text{(TF)} \quad -\frac{1}{2}(y - 24) &= (x - \frac{7}{2})^2
 \end{aligned}$$

} lowest Terms!