Math 11 **Quadratics #2 – Review #1**

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) => 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) => 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) $y = \frac{1}{4}x^2 + 1$

$-4(y-1) = x^2$ (TF)
$y - 1 = -\frac{1}{4}x^2$
$y = -\frac{1}{4}x^2 + 1$ (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)
$y - 1 = \frac{1}{3}(x-2)^2$
$3(y-1) = (x-2)^2$ (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)
$y = 2(x-1)(x-1) + 3$
$y = (2x-2)(x-1) + 3$
$y = 2x^2 - 2x - 2x + 2 + 3$
$y = 2x^2 - 4x + 5$ (SF)

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) $y = 1$

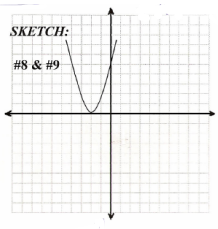
Vertex: (3, 1)
Axis of Symmetry: $x = 3$

7. What would be the range of the following quadratic function: $-2(y-1) = (x+1)^2$
   a) $\{y \mid y \geq -2, y \in R\}$ b) $\{x \mid x \leq -1, x \in R\}$ c) $\{y \mid y \leq 1, y \in R\}$ d) $\{x \mid x \geq 1, x \in R\}$

Vertex: (-1, 1)
Range: $\{y \mid y \leq 1, y \in R\}$
* Opens Downward.

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

SKETCH:
#8 & #9

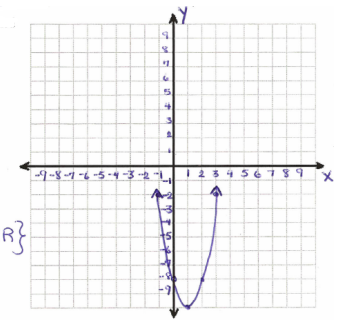


What would happen if "h" was changes? The graph would:
   a) move sideways b) move up or down
   c) be reflected in the x-axis d) be stretched

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? $\{x \mid x \in R\}$

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

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

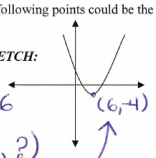
a) (12, 0) b) (6, -4) c) (6, 4) d) (8, -4)

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

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

=> Vertex: (6, ?)

SKETCH:



** 2 possible solutions → check sketch!

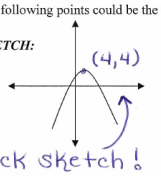
12. The x-intercepts of a parabola are (-3, 0) and (11, 0). Which of the following points could be the vertex?

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

Average of x-values: $\frac{-3+11}{2} = \frac{8}{2} = 4$

=> Vertex: (4, ?)

SKETCH:



* 2 possible solutions → 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) $3y - 2 = (x-1)^2$

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

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

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

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

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

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

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

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

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

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

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

$y - 40 = x^2 + 12x$

$y - 40 + 36 = (x^2 + 12x + 36)$

$y - 4 = (x+6)^2$

(SF) $y = (x+6)^2 + 4$

(TF) $(y-4) = (x+6)^2$

$y + 10 = -2x^2 + 8x$

$y + 10 = -2(x^2 - 4x)$

$y + 10 - 8 = -2(x^2 - 4x + 4)$

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

(SF) $y = -2(x-2)^2 - 2$

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

d) $y = 3x^2 + 12x$

$y = 3(x^2 + 4x)$

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

$y + 12 = 3(x+2)^2$

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

(TF) $\frac{1}{3}(y+12) = (x+2)^2$

d) $y = -2x^2 + 14x - \frac{1}{2}$

$y + \frac{1}{2} = -2x^2 + 14x$

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

$y + \frac{1}{2} - \frac{98}{4} = -2(x^2 - 7x + \frac{49}{4})$

$y + \frac{2}{4} - \frac{98}{4} = -2(x - \frac{7}{2})^2$

$y - \frac{96}{4} = -2(x - \frac{7}{2})^2$

(SF) $y = -2(x - \frac{7}{2})^2 + 24$ } lowest terms!

(TF) $-\frac{1}{2}(y-24) = (x - \frac{7}{2})^2$