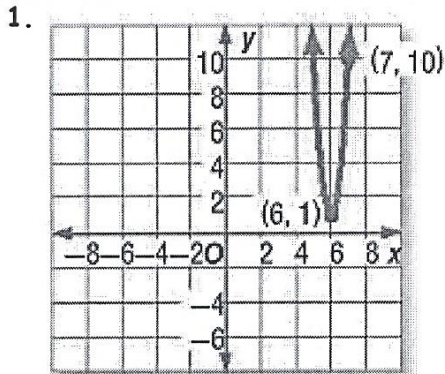


Writing Quadratic Functions HOMEWORK

Name Master
Date _____ Block _____

1-6: Write a quadratic function in vertex form AND then in standard form for the graph shown.



$$y = a(x - 6)^2 + 1$$

$$10 = a(7 - 6)^2 + 1$$

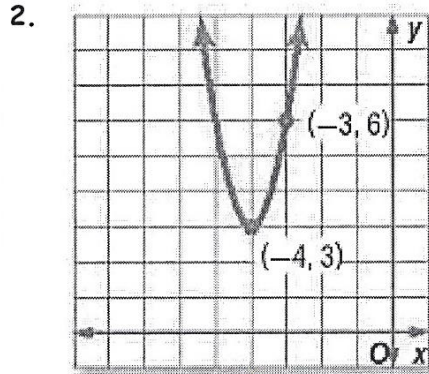
$$10 = a + 1 \Rightarrow a = 9$$

$$y = 9(x - 6)^2 + 1$$

$$y = 9(x^2 - 12x + 36) + 1$$

$$y = 9x^2 - 108x + 324 + 1$$

$$y = 9x^2 - 108x + 325$$



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

$$6 = a(-3 + 4)^2 + 3$$

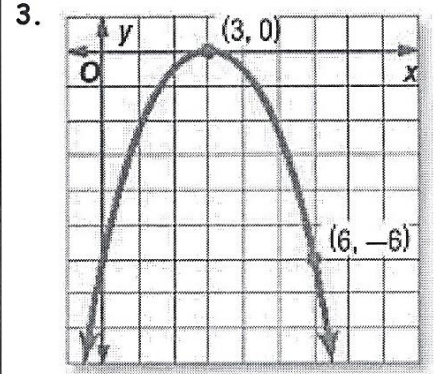
$$6 = a + 3 \Rightarrow a = 3$$

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

$$y = 3(x^2 + 8x + 16) + 3$$

$$y = 3x^2 + 24x + 48 + 3$$

$$y = 3x^2 + 24x + 51$$



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

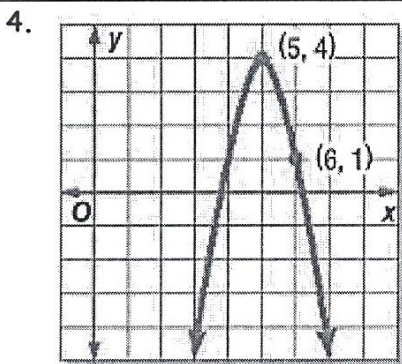
$$-6 = a(6 - 3)^2$$

$$-6 = 9a \Rightarrow a = -\frac{6}{9} \Rightarrow a = -\frac{2}{3}$$

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

$$y = -\frac{2}{3}(x^2 - 6x + 9)$$

$$y = -\frac{2}{3}x^2 + 4x - 6$$



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

$$1 = a(6 - 5)^2 + 4$$

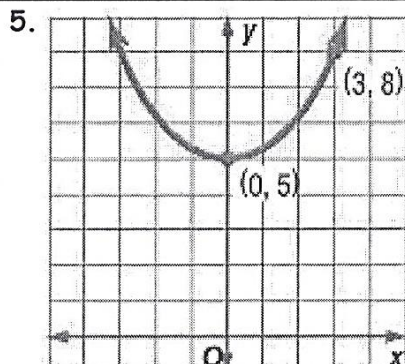
$$1 = a + 4 \Rightarrow a = -3$$

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

$$y = -3(x^2 - 10x + 25) + 4$$

$$y = -3x^2 + 30x - 75 + 4$$

$$y = -3x^2 + 30x - 71$$



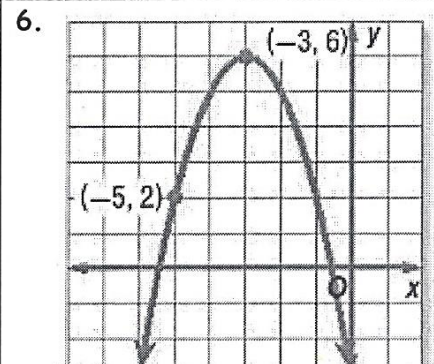
$$y = a(x - 0)^2 + 5$$

$$8 = a(3 - 0)^2 + 5$$

$$8 = 9a + 5$$

$$3 = 9a \Rightarrow a = \frac{3}{9} \Rightarrow a = \frac{1}{3}$$

$$y = \frac{1}{3}x^2 + 5$$



$$y = a(x + 3)^2 + 6$$

$$2 = a(-5 + 3)^2 + 6$$

$$2 = 4a + 6$$

$$-4 = 4a \Rightarrow a = -1$$

$$y = -(x + 3)^2 + 6$$

$$y = -(x^2 + 6x + 9) + 6$$

$$y = -x^2 - 6x - 9 + 6$$

$$y = -x^2 - 6x - 3$$

7-12: Write the standard form of each quadratic described. (Hint: Think of all three forms.)

7. I have a minimum of (3, -5) and a vertical stretch of 3

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

$$y = 3(x^2 - 6x + 9) - 5$$

$$y = 3x^2 - 18x + 27 - 5$$

$$y = 3x^2 - 18x + 22$$

8. I have zeros at -2 and 1 and the point (2, -8)

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

$$-8 = a(2+2)(2-1)$$

$$-8 = a(4)(1) \Rightarrow 4a = -8$$

$$a = -2$$

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

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

$$y = -2x^2 - 2x + 4$$

9. I have only one zero at -2 and a y-intercept at (0, 12)

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

$$12 = a(0+2)^2$$

$$12 = 4a \Rightarrow a = 3$$

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

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

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

10. I have a minimum of (3, -7) and a vertical stretch of $\frac{1}{2}$

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

$$y = \frac{1}{2}(x^2 - 6x + 9) - 7$$

$$y = \frac{1}{2}x^2 - 3x + \frac{9}{2} - 7$$

$$y = \frac{1}{2}x^2 - 3x - \frac{5}{2}$$

11. I have zeros at 4 and 6 and my y-intercept is -6.

$$y = a(x-4)(x-6)$$

$$-6 = a(-4)(-6)$$

$$-6 = 24a \Rightarrow a = -\frac{1}{4}$$

$$y = -\frac{1}{4}(x-4)(x-6)$$

$$y = -\frac{1}{4}(x^2 - 10x + 24)$$

$$y = -\frac{1}{4}x^2 + \frac{5}{2}x - 6$$

12. I have a vertical stretch of 4 and zeros at $-\frac{3}{2}$ and $\frac{1}{4}$

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

$$y = 4(2x + 3)(4x - 1)$$

$$y = 4(8x^2 + 10x - 3)$$

$$y = 32x^2 + 40x - 12$$

13 - 18: Use the calculator to answer each question. Round decimals to the nearest hundredth.

An object is fired straight up from the top of a 200 foot tower at a velocity of 80 feet per second. The height $h(t)$ of the object t seconds after firing is given by $h(t) = -16t^2 + 80t + 200$.

13. What is the y-intercept? What is the meaning of the y-intercept in the context of this problem?
 $(0, 200) \Rightarrow$ It represents the initial height where the object was thrown.

14. What was the maximum height reached by the object? 300 feet
 $\sqrt{(2.499\dots), 300}$

15. When did the object reach its maximum height? at 2.50 seconds

16. How high would the object be after 3.2 seconds? 292.16 feet
 When $x = 3.2$, $y = 292.16$

17. When did the object reach 100 feet? at 6.04 seconds
 Plot $y = 100$ & find the point of intersection: $(6.0355, 100)$

18. When did the object hit the ground? at 6.83 seconds
 Calc. the right zero: $(6.8301\dots, 0)$