

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

1. Find the vertex of the graphs of the following quadratic equations.

A. $y = 2(x - 5)^2 + 3.5$ (5, 3.5)

B. $y = -(x + 1)^2 - 8$ (-1, -8)

For each problem below, identify which equations satisfy the given conditions. In some cases, there may only be one equation that works, while others have multiple equations that fulfill the requirements.

2. Vertex: (3, -2)

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

$f(x) = (x - 3)^2 + 2$

$f(x) = -(x - 3)^2 + 2$

$f(x) = (x - 3)^2 - 2$

$f(x) = -(x - 3)^2 - 2$

3. Vertex: (1, 4); y-intercept: 5

$f(x) = (x - 1)^2 + 4 \rightarrow x^2 - 2x + 5$

$f(x) = x^2 - 2x + 5$

$f(x) = -x^2 + 2x + 5$ - VERTEX (1, 6)

$f(x) = 2x^2 - 4x + 5$ - VERTEX (1, 3)

$f(x) = -(x - 1)^2 + 4 \rightarrow -x^2 + 2x + 3$

$$-x^2 + 2x + 5$$

$$x = \frac{-2}{2(-1)} = \frac{-2}{-2} = 1$$

$$y = -(1)^2 + 2(1) + 5$$

$$y = -1 + 2 + 5 = 6$$

VERTEX (1, 6)

$$2x^2 - 4x + 5$$

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

$$y = 2(1)^2 - 4(1) + 5$$

$$2 - 4 + 5 = 3$$

VERTEX (1, 3)

4. y-intercept: 3

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

$f(x) = x^2 - 2x + 3$

$f(x) = -(x-1)^2 + 4 \rightarrow -x^2 + 2x + 3$

$f(x) = -2(x+1)^2 + 5 \rightarrow -2x^2 - 4x + 3$

$-(x-1)(x-1)+4$
 $-(x^2-2x+1)+4$
 $-x^2+2x-1+4$
 $-x^2+2x+3$

$-2(x+1)(x+1)+5$
 $-2(x^2+2x+1)+5$
 $-2x^2-4x-2+5$
 $-2x^2-4x+3$

5. Prove your results from Problem 2. (The equations are given at the right for your convenience.)

2. Vertex: (3, -2)
- $f(x) = 3x^2 + 2$
 - $f(x) = (x-3)^2 + 2$
 - $f(x) = -(x-3)^2 + 2$
 - $f(x) = (x-3)^2 - 2$
 - $f(x) = -(x-3)^2 - 2$

Determine the axis of symmetry for each quadratic equation below.

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

<p>6. $f(x) = 3x^2 + 7$</p> <p>$3x^2 + 0x + 7$</p> <p>$x = \frac{-0}{2(3)} = \frac{0}{6} = 0$</p> <p>x=0</p>	<p>7. $g(x) = x^2 - 2x + 3$</p> <p>$x = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$</p> <p>x=1</p>	<p>8. $h(x) = 2(x-1)^2 + 2$</p> <p>VERTEX (1,2)</p> <p>AOS: x=1</p>
<p>9. $y = -(x-4)^2 + 8$</p> <p>Vertex (4,8)</p> <p>AOS: x=4</p>	<p>10. $m(x) = 3(x-1)^2$</p> <p>VERTEX (1,0)</p> <p>AOS: x=1</p>	<p>11. $y = \frac{1}{2}x^2 - 4x + 5$</p> <p>$x = \frac{-(-4)}{2(\frac{1}{2})} = \frac{4}{1} = 4$</p> <p>x=4</p>
<p>12. $f(x) = \frac{1}{4}(x-4)^2 - 2$</p> <p>vertex: (4,-2)</p> <p>AOS: x=4</p>	<p>13. $g(x) = \frac{3}{2}x^2 + 6x - 4$</p> <p>$x = \frac{-6}{2(\frac{3}{2})} = \frac{-6}{3} = -2$</p> <p>x=-2</p>	<p>14. $y = (3x-1)^2 + 3$</p> <p>**</p> <p>$(3x-1)(3x-1)+3$</p> <p>$9x^2 - 6x + 1 + 3$</p> <p>$9x^2 - 6x + 4$</p> <p>$x = \frac{-(-6)}{2(9)} = \frac{6}{18} = \frac{1}{3}$</p> <p>x=1/3</p>

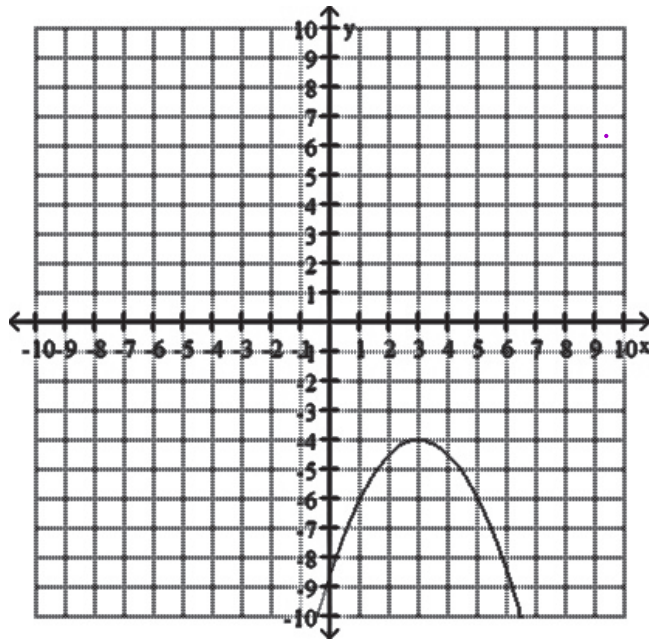
* change into standard form

For each graph below, state the vertex, axis of symmetry and write the equation of each function.

15. Vertex: (3, 4)

Axis of Symmetry: $x = 3$

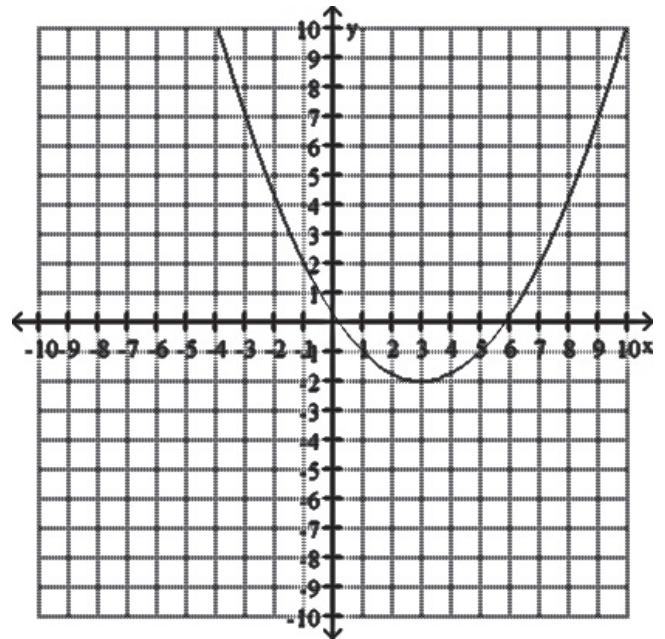
$$y = -\frac{1}{2}(x - 3)^2 - 4$$



16. Vertex: (3, -2)

Axis of Symmetry: $x = 3$

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



17. Write an equation of a quadratic function that has an axis of symmetry of $x = 0$.

possible answer

$$\text{Ex. } y = (x - 0)^2 + 5$$

or

$$y = x^2 + 5$$