See ANSWERS below on page 2.

Write each equation in vertex form. Then, state the vertex and axis of symmetry.

1. $y = -2x^2 – 16x – 32$

2. $y = x^2 – 6x + 7$

3. $y = -x^2 + 4x – 1$

4. $y = 2x^2 – 8x + 9$

Write the equation in vertex form, given the criteria below.

5. vertex (0, 0) passes through (-2, 8)

6. vertex (2, 0) passes through (1, 3)

7. vertex (-3, 0) passes through (-5, -4)

8. Write the equation of the quadratic function that is moved to the right 4, down 3, reflected over the x axis and stretched by a scale factor of 2.

9. Write the equation of the quadratic function that is moved to the left 1, up 9, and stretched by a scale factor of 1/2.

Answers:

1. $y = -2(x + 4)^2$, (-4, 0), x = -4

$\left(\frac{8}{2}\right)^2 = 16$

$y = -2x^2 - 16x - 32$

$+32 \quad +32$

$32 = -2x^2 - 16x$

$-2(16) + 32 = -2(x^2 + 8x + 16)$

$0 = -2(x + \frac{b}{2})^2$

$0 = -2(x+4)^2$

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

Vertex (-4, 0)

AOS: x = -4

2. $y = (x - 3)^2 - 2$, (3, -2), x = 3

$\left(\frac{-6}{2}\right)^2 = 9$

$y = x^2 - 6x + 7$

$-7 \quad -7$

$9 + -7 = x^2 - 6x + 9$

$2 = (x + \frac{b}{2})^2$

$2 = (x-3)^2$

$-2 \quad -2$

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

Vertex: (3, -2)

AOS: x = 3

3. $y = -(x - 2)^2 + 3$, (2, 3), x = 2

$\left(\frac{-4}{2}\right)^2 = 4$

$y = -x^2 + 4x - 1$

$+1 \quad +1$

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

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

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

$+3 \quad +3$

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

Vertex: (2, 3)

AOS: x = 2

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

$\left(\frac{-4}{2}\right)^2 = 4$

$y = 2x^2 - 8x + 9$

$-9 \quad -9$

$2(4) + -9 = 2(x^2 - 4x + 4)$

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

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

$+1 \quad +1$

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

vertex: (2, 1)

AOS: x = 2

5. $y = 2x^2$

vertex (0, 0) pt: (-2, 8)

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

$8 = a(-2)^2$

$\frac{8}{4} = \frac{4a}{4}$ $a = 2$

$y = 2x^2$

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

vertex (2,0) pt: (1,3)

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

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

$3 = a$

$a = 3$

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

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

vertex (-3,0) pt: (-5,-4)

$y = a(x+3)^2 + 0$

$-4 = a(-5+3)^2$

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

$a = -1$

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

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

9. $y = \frac{1}{2}(x + 1)^2 + 9$