

2.2**Enrichment and Extension****Writing Quadratic Functions**

Example: Write an equation of the quadratic function in standard form that has a vertex at $(2, 5)$ and passes through the point $(3, 7)$.

Solution:

$$y = a(x - h)^2 + k \quad \text{Write the vertex form of a quadratic function.}$$

$$y = a(x - 2)^2 + 5 \quad \text{Substitute 2 for } h \text{ and 5 for } k.$$

$$7 = a(3 - 2)^2 + 5 \quad \text{Substitute 3 for } x \text{ and 7 for } y.$$

$$a = 2 \quad \text{Solve for } a.$$

$$y = 2(x - 2)^2 + 5 \quad \text{Substitute 2 for } h, 5 \text{ for } k, \text{ and 2 for } a.$$

$$y = 2x^2 - 8x + 13 \quad \text{Simplify.}$$

In Exercises 1–6, write an equation of the quadratic function in standard form.

1. vertex $(1, -2)$ and passes through point $(3, 10)$
2. vertex $(-1, -2)$ and passes through point $(-4, 7)$
3. vertex $(-2, 9)$ and passes through point $(1, -9)$
4. vertex $(-1, 0)$ and passes through point $(-3, -12)$
5. vertex $(1, 6)$ and passes through point $(2, 5)$
6. vertex $(-2, 0)$ and passes through point $(2, 8)$
7. Could there be a quadratic function that has an undefined axis of symmetry? Why or why not?
8. The graph of a quadratic function has a vertex at $(3, -6)$. One point on the graph is $(7, 10)$. What is another point on the graph? Explain how you found the other point.