Name:                                                    Date:

**UNIT 5 • POLYNOMIAL OPERATIONS AND QUADRATIC FUNCTIONS**   F–IF.7*, F–IF.8a
Lesson 5.9: Interpreting Various Forms of Quadratic Functions

### Practice 5.9: Interpreting Various Forms of Quadratic Functions                A

Use the given functions to complete all parts of problems 1–3.

1. $f(x) = x^2 - 6x + 8$

    a. Identify the $y$-intercept.

    b. Identify the vertex.

    c. Identify whether the function has a maximum or minimum.

2. $f(x) = -0.5(x + 2)(x - 4)$

    a. Identify the $x$-intercepts.

    b. Identify the $y$-intercept.

    c. Identify the axis of symmetry.

    d. Identify the vertex.

3. $f(x) = -16(x - 1)^2 + 10$

    a. Identify the vertex.

    b. Identify whether the function has a maximum or minimum.

Use the given information in each scenario that follows to complete the remaining problems.

4. A bird is descending toward a lake to catch a fish. The bird's flight can be modeled by the equation $h(t) = t^2 - 14t + 40$, where $h(t)$ is the bird's height above the water in feet and $t$ is the time in seconds since you saw the bird. Graph the function. What is the vertex? What does the minimum value mean in the context of the problem?

5. A military pilot fires a test missile whose path can be modeled by the equation $f(x) = -(x - 40)(x + 2)$, where $f(x)$ is the height of the missile in miles and $x$ is the number of seconds since the missile was fired. Graph this function. What are the $x$-intercepts and what do they mean in the context of the problem? After how many seconds is the height of the missile the same as the initial height?

*continued*

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6.  The path of a snowboarder performing stunts is given by the equation $f(x) = -16(x - 2)(x + 1)$, where $x$ is time in seconds and $f(x)$ is the height of the snowboarder above the ground. Graph the function. What are the $x$-intercepts? Explain the meaning of the $x$-intercepts in the context of the problem. How long does the stunt last?

7.  The flight of a paper airplane follows the quadratic equation $H(x) = -(x - 3)^2 + 25$, where $H(x)$ represents the height of the paper airplane in feet, and $x$ is the horizontal distance in feet the airplane travels after it is thrown. Graph the function. What is the vertex? Explain the meaning of the vertex in the context of the problem.

8.  The height of a golfer's ball is given by the equation $y = -16x^2 + 32x$, where $y$ represents the height in feet and $x$ represents the time in seconds. Graph the function. What is the vertex and what does it mean in the context of the problem?

9.  The revenue, $R(x)$, generated by an increase in price of $x$ dollars for an item is represented by the equation $R(x) = -5(x - 15)(x + 5)$. Graph the function. What are the $x$-intercepts and what do they represent in the context of the problem? What value of $x$ maximizes the revenue?

10. Reducing the cost of an item can result in a greater number of sales. The revenue function that predicts the revenue in dollars, $R(x)$, for each $1 decrease in price, $x$, is $R(x) = -(x - 7)^2 + 289$. Graph the function. What is the vertex and what does it represent in the context of the problem?