

**11.6.D1 – VERTEX FORM OF QUADRATIC FUNCTIONS**

Write a vertical motion model of the form  $h(t) = -16t^2 + v_0t + h_0$  that represents the problem situation. Then use a graphing calculator to find the function's vertex and its axis of symmetry. Refer to the 11.4 example "Determining the Vertex of Quadratic Functions" in the Chapter 11 Summary.

1. A catapult hurls a watermelon from a height of 40 feet at an initial velocity of 64 feet per second.
2. A baseball is thrown from a height of 6 feet at an initial velocity of 32 feet per second.

Determine the axis of symmetry of each parabola. Refer to the TWO 11.5 examples "Determining the Axis of Symmetry of Quadratic Functions" & "Determine the Axis of Symmetry Using Symmetric Points" in the Chapter 11 Summary.

3. The  $x$ -intercepts of a parabola are  $(-12, 0)$  &  $(-1, 0)$ .
4. Two symmetric points on a parabola are  $(3, 1)$  &  $(15, 1)$ .

Determine the vertex of each parabola. Refer to the 11.5 example "Determining the Vertex of Quadratic Functions" in the Chapter 11 Summary.

5.  $f(x) = x^2 - 8x + 7$   
axis of symmetry:  $x = 4$
6.  $f(x) = -x^2 + 16$   
Two symmetric points:  $(-3, 7)$  &  $(3, 7)$

Determine the vertex of each parabola. Refer to the 11.5 example "Identifying the Vertex of Quadratic Functions in Vertex Form" in the Chapter 11 Summary.

7.  $f(x) = (x - 3)^2 + 8$
8.  $f(x) = -2(x - 1)^2 - 8$
9.  $f(x) = -(x + 9)^2 - 1$

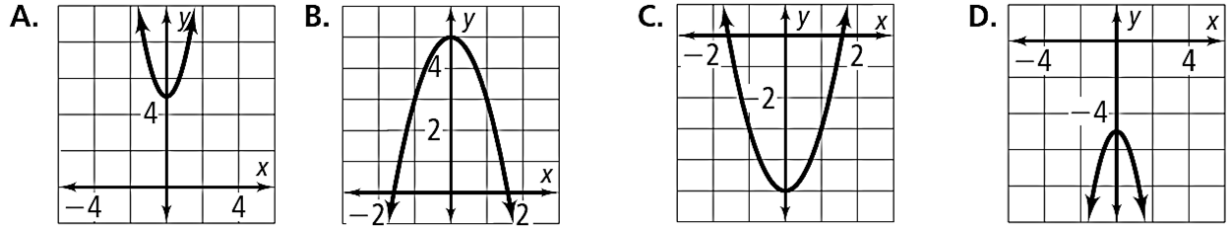
Determine another point on each parabola. Refer to the 11.5 example "Determining Symmetric Points on the Parabola Using the Vertex" in the Chapter 11 Summary.

10. point:  $(0, 6)$ ; axis of symmetry:  $x = -4$
11. point:  $(4, 1)$ ; vertex:  $(3, -1)$

Write a quadratic function in factored form with each set of given characteristics. **Let  $a = +4$ .** Refer to the 11.4 example "Writing a Quadratic Function in Factored Form Given its  $x$ -Intercepts" in the Chapter 11 Summary.

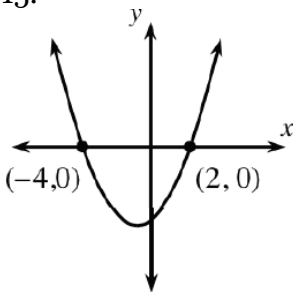
12. Opens downward & has  $x$ -intercepts  $(-3, 0)$  &  $(4, 0)$
13. Opens upward & has  $x$ -intercepts  $(5, 0)$  &  $(12, 0)$

14. Which graph is that of the quadratic function  $y = -2x^2 - 5$ ? Explain your reasoning.

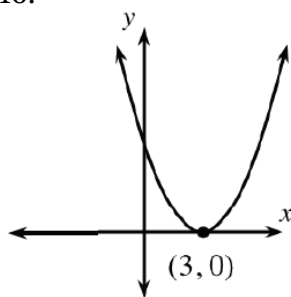


Write a quadratic function in factored form or vertex form with each set of given characteristics. **Let  $a = \pm 1$ .** Refer to the 11.6 example “Writing an Equation of a Parabola Given Information about Its Graph” in the Chapter 11 Summary.

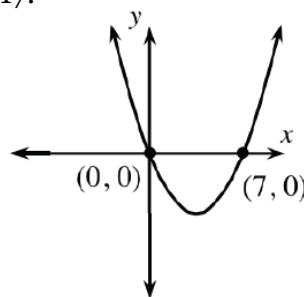
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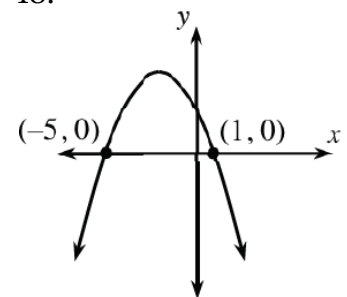
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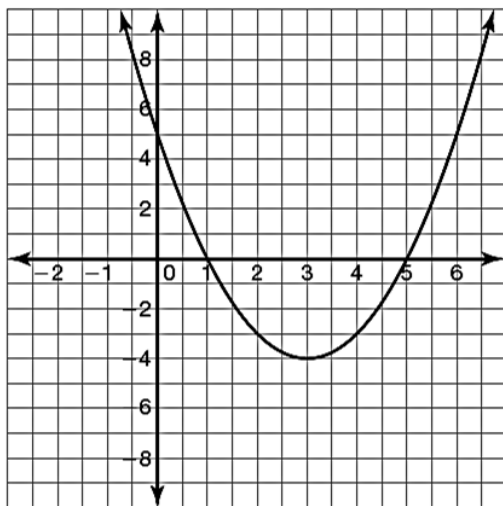
17.



18.



19. For the function shown, identify the domain, range, vertex, axis of symmetry,  $y$ -intercept, zeros, and the intervals of increase and decrease. Refer to the THREE 11.3 examples “Identifying/Determining Domain & Range/ Zeros/Intervals of Increase & Decrease of a Quadratic Function” in the Chapter 11 Summary.



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertex: \_\_\_\_\_

Axis of symmetry: \_\_\_\_\_

$y$ -intercept: \_\_\_\_\_

Zeros: \_\_\_\_\_

Interval of increase: \_\_\_\_\_

Interval of decrease: \_\_\_\_\_

a. Use the zeros to write the factored form of the quadratic function. **Let  $a = 0.25$ .**

b. Use the vertex to write the vertex form of the quadratic function. **Let  $a = 0.25$ .**