Lesson 16 Practice Problems
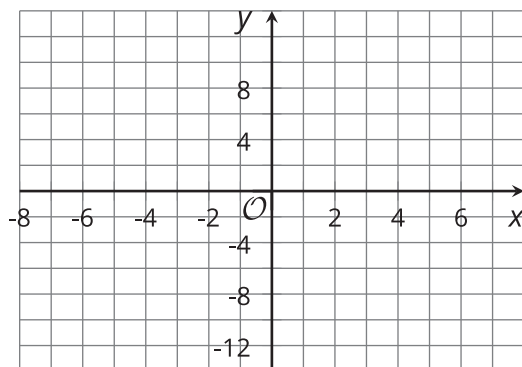
1. Which equation can be represented by a graph with a vertex at $(1, 3)$?

   A. $y = (x - 1)^2 + 3$

   B. $y = (x + 1)^2 + 3$

   C. $y = (x - 3)^2 + 1$

   D. $y = (x + 3)^2 + 1$
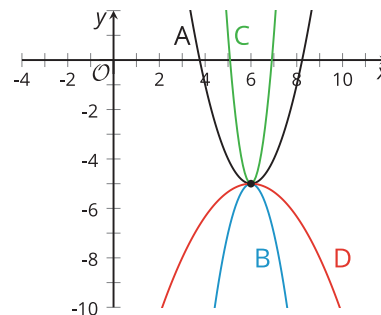
2.   a. Where is the vertex of the graph that represents $y = (x - 2)^2 - 8$?

   b. Where is the y-intercept? Explain how you know.

   c. Identify one other point on the graph of the equation. Explain or show how you know.

   d. Sketch a graph that represents the equation.

3. The function v is defined by $v(x) = \frac{1}{2}(x + 5)^2 - 7$.

   Without graphing, determine if the vertex of the graph representing v shows the minimum or maximum value of the function. Explain how you know.

4. Match each graph to an equation that represents it.

A. Graph A

B. Graph B

C. Graph C

D. Graph D

1. $y = -2(x-6)^2 - 5$

2. $y = (x-6)^2 - 5$

3. $y = 6(x-6)^2 - 5$
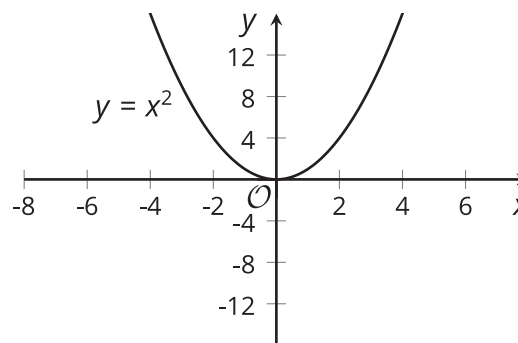
4. $y = -\frac{1}{3}(x-6)^2 - 5$

5. Here is a graph that represents $y = x^2$.

a. Describe what would happen to the graph if the original equation was changed to:
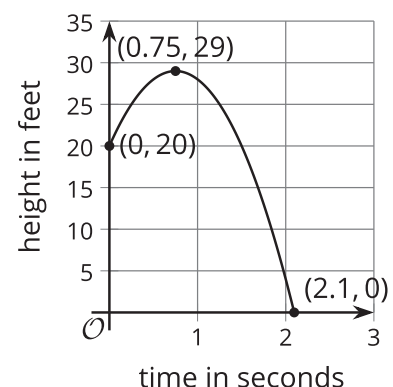
i. $y = \frac{1}{2}x^2$

ii. $y = x^2 - 8$

b. Graph the equation $y = \frac{1}{2}x^2 - 8$ on the same coordinate plane as $y = x^2$.

(From Unit 6, Lesson 12.)

6. Clare throws a rock into the lake. The graph shows the rock's height above the water, in feet, as a function of time in seconds.

Select **all** the statements that describe this situation.

A. The vertex of the graph is $(0.75, 29)$.

B. The y-intercept of the graph is $(2.1, 0)$.

C. Clare just dropped the rock into the lake.

D. The maximum height of the rock is about 20 feet.

E. The rock hits the surface of the water after about 2.1 seconds.

F. Clare tossed the rock up into the air from a point 20 feet above the water.

(From Unit 6, Lesson 14.)

7. *Technology required.* Two objects are launched into the air.

   ○ The height, in feet, of Object A is given by the equation $f(t) = 4 + 32t - 16t^2$.

   ○ The height, in feet, of the Object B is given by the equation $g(t) = 2.5 + 40t - 16t^2$. In both functions, t is seconds after launch.

Use technology to graph each function in the same graphing window.

   a. What is the maximum height of each object?

   b. Which object hits the ground first? Explain how you know.

(From Unit 6, Lesson 14.)

8. Andre thinks the vertex of the graph of the equation $y = (x + 2)^2 - 3$ is $(2, -3)$. Lin thinks the vertex is $(-2, 3)$. Do you agree with either of them?

(From Unit 6, Lesson 15.)

9. The expression $2{,}000 \cdot \left(1.015^{12}\right)^{5}$ represents the balance, in dollars, in a savings account.

    a. Using the expression, describe the interest rate paid on the account.

    b. How many years has the account been accruing interest?

    c. How much money was invested?

    d. How much money is in the account now?

    e. Write an equivalent expression to represent the balance in the savings account.

(From Unit 5, Lesson 17.)