Identify the choice that best answers the question.

1.

Which of the following represents a quadratic function opening downwards?

(A) $y = 3x^2(x-1)$ (B) $y = 3x(x-1)$ (C) $y = -3x^2(x-1)$ (D) $y = -3x(x-1)$

2.

What is the domain and range of the quadratic function graphed?

(A) Domain: $\{x \mid -1 \le x \le 3 ; x \in R\}$ Range: $\{x \mid y \ge -8 ; y \in R\}$
(B) Domain: $\{x \mid -1 \le x \le 3 ; x \in R\}$ Range: $\{x \mid y \le -8 ; y \in R\}$
(C) Domain: $\{x \mid x \in R\}$ Range: $\{x \mid y \le -8 ; y \in R\}$
(D) Domain: $\{x \mid x \in R\}$ Range: $\{x \mid y \ge -8 ; y \in R\}$

3.

Which represents the quadratic function $y = -2(x+1)(x-3)$ in standard form?

(A) $y = -2x^2 + 6$ (B) $y = -2x^2 + 4x - 6$
(C) $y = -2x^2 - 4x - 6$ (D) $y = -2x^2 + 4x + 6$

4.

Which statement is correct for the function graphed below?

(A) There is a maximum value of 3.   (B) There is a maximum value of 2.
(C) There is a minimum value of 3.   (D) There is a minimum value of 2.

5.

Which of the quadratic functions has the narrowest graph?

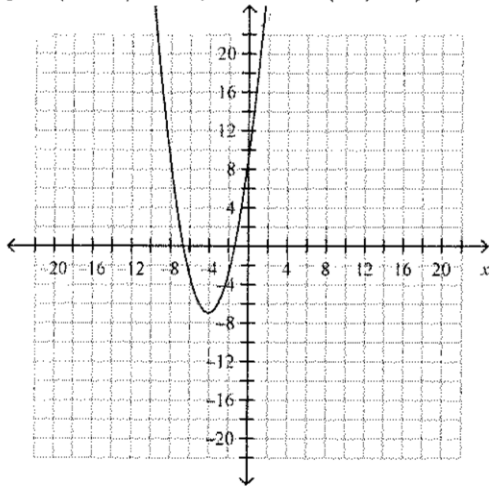A $y = -3x^2$ B $y = \frac{1}{7}x^2$ C $y = \frac{1}{3}x^2$ D $y = -4x^2$
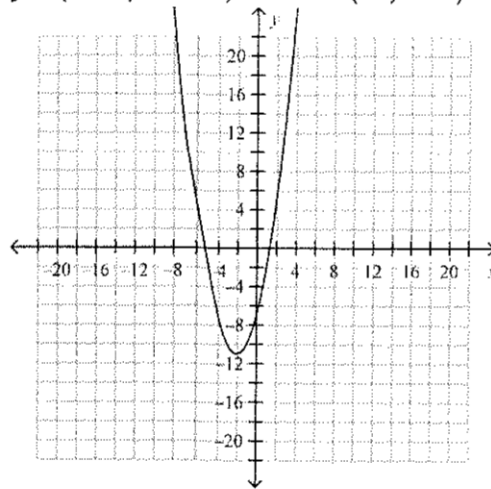
6.

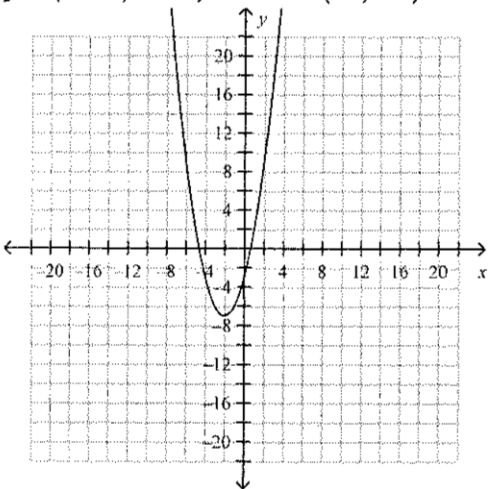Convert $y = x^2 + 4x - 7$ to vertex form, identify the vertex and the graph.

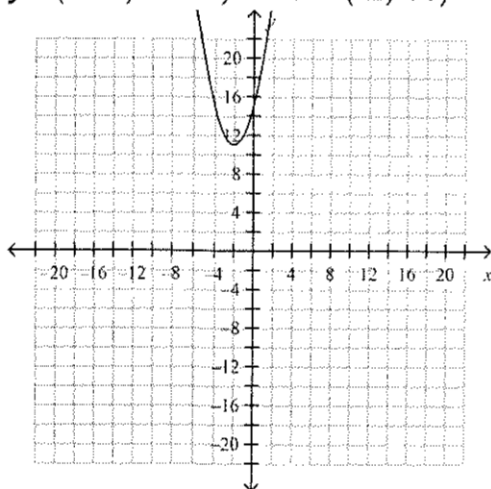**A** $y = (x+4)^2 - 7$; vertex (-4, -7)

C $y = (x+2)^2 - 11$; vertex (-2, -11)

B $y = (x+2)^2 - 7$; vertex (-2, -7)

D $y = (x+2)^2 + 11$; vertex (-2, 11)

7.

The path of a marshmallow launched from a slingshot can be described by the equation $f(x) = -x^2 + 4x + 5$, where $f(x)$ is the height of the marshmallow and x is the number of seconds that have passed since the slingshot's band was released. Which of the following points shows the maximum height of the marshmallow?

a. (0, 5)   b. (2, 9)   c. (0, −1)   d. (4, 5)

8.

What is the average rate of change of the function $f(x) = 6x^2 + 12x - 4$ between $x = -1$ and $x = 1$?

a. 12   b. 24   c. 4   d. −12

9.

What transformation of the parent function, $f(x) = x^2$, is the function $f(x) = -(x+2)^2$?

A Reflect across the x-axis and translate right 2.

C Reflect across the x-axis and translate left 2.

B Reflect across the y-axis and translate up 2.

D Reflect across the y-axis and translate down 2.

10.

What is the equation of a quadratic function in standard form that has zeros $x = 3$ and $x = 5$ and that passes through the point $(-1, 24)$?

a. $f(x) = 3x^2 - 4x + 4$

b. $f(x) = x^2 + 8x + 15$

c. $f(x) = x^2 - 8x + 15$

d. $f(x) = 3x^2 - 8x + 15$

11.

Solve $x^2 - 7x = -12$ for x.

a. $x = 3; x = 4$

b. $x = -4; x = -3$

c. $x \approx -1.42; x \approx 8.42$

d. $x \approx -8.43; x \approx 1.42$

12.

The dimensions of a community garden are such that the length is 6 feet shorter than 3 times its width. What expression describes the area of the community garden in terms of its width, w?

a. $(w + 3)(w + 6)$ ft²

b. $w(6w - 3)$ ft²

c. $3w(w - 6)$ ft²

d. $w(3w - 6)$ ft²

13.

If the vertex of $f(x)$ is $(3, -5)$, what is the vertex of $f(x + 3)$?

a. $(3, -8)$

b. $(6, -5)$

c. $(3, -2)$

d. $(0, -5)$

14.

Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of
$$y = 4x^2 + 5x - 1$$

A $x = \dfrac{5}{8}$; vertex: $\left(\dfrac{5}{8}, 4\dfrac{5}{8}\right)$

B $x = \dfrac{5}{8}$; vertex: $\left(\dfrac{5}{8}, 3\dfrac{11}{16}\right)$

C $x = -\dfrac{5}{8}$; vertex: $\left(-\dfrac{5}{8}, -5\dfrac{11}{16}\right)$

D $x = -\dfrac{5}{8}$; vertex: $\left(-\dfrac{5}{8}, -2\dfrac{9}{16}\right)$

15.

Write a function that represents the parent function, $y = x^2$, after it has been translated 3 up and 2 right.

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

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

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

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

Constructed Response. Show all work in space provided.

16. An object is launched and follows the path expressed by the function h(t) = -16t² + 16t + 32 where h is the height at t seconds.

A. Find the height, in feet, of the object at 1 second after it is launched. Explain how you determined your answer.

B. How long will it take before the object hits the ground?

17.
You are a manager at a manufacturing company, and are trying to determine the pricing for a new product. Two different consultants come up with profit prediction functions for different prices. Consultant A's predictions are summarized in the table. Consultant B's predictions are summarized in the graph.

x	P(x)
16	0
20	3,200
24	5,120
28	5,760
32	5,120
36	3,200
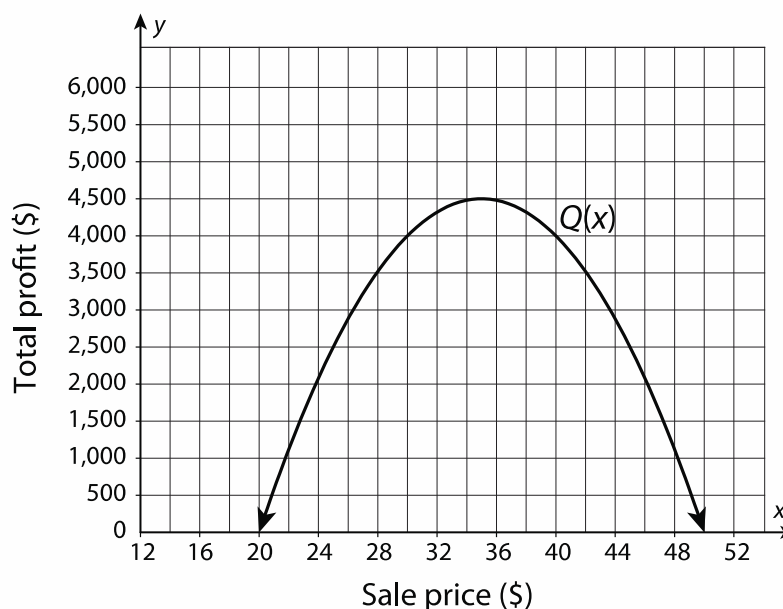
a. The ideal sale price is the price that maximizes the profit. Which function has a higher ideal sale price?

b. Which function predicts a higher maximum profit?

c. What does the domain represent in the context of the problem? What is a reasonable domain for each function?

d. What does the range represent in the context of the problem? What is a reasonable range for each function?