Transformations of Quadratic Functions

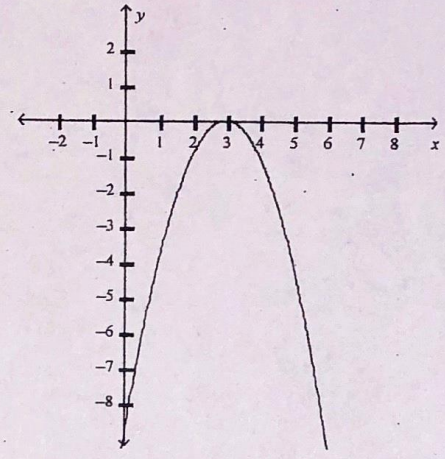
Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. Which correctly identifies the values of the parameters a, h, and k for the function $f(x) = -2(x+3)^2 + 1$

a. $a = -2, h = 3, k = 1$
c. $a = -2, h = -3, k = 1$
b. $a = 2, h = -3, k = -1$
d. $a = -2, h = -3, k = -1$

____ 2. What is the equation of this graph?



a. $y = -x^2 + 3$
c. $y = -(x+3)^2$
b. $y = -3x^2$
d. $y = -(x-3)^2$

____ 3. Which function includes a translation of 3 units to the left?

a. $f(x) = (x+3)^2 + 1$
c. $f(x) = (x-3)^2 + 1$
b. $f(x) = 3x^2 + 1$
d. $f(x) = (x+1)^2 - 3$

____ 4. Which equation shows a translation of 3 left and vertical compression by a factor of 2 to the graph of $y = x^2$?

a. $y = 2(x-3)^2$
c. $y = \frac{1}{2}(x-3)^2$
b. $y = 2(x+3)^2$
d. $y = \frac{1}{2}(x+3)^2$

____ 5. Joanne hit a ball straight up into the air. The height of the ball in metres, is given by the function $h(t) = -5(t-3)^2 + 45$ t seconds after the ball is hit. In how many seconds will the ball hit the ground?

a. 3
c. 9
b. 6
d. 45

____ 6. Kevin threw a ball straight up with an initial speed of 20 metres per second. The function $y = -5(x-2)^2 + 20$ describes the ball's height, in metres, t seconds after Kevin threw it. What are the coordinates of the vertex?

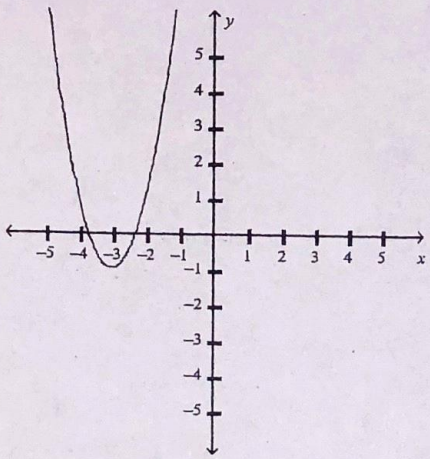
a. $(-5, 2)$
c. $(20, 2)$
b. $(2, 20)$
d. $(-5, 20)$

____ 7. Which equation describes a parabola that opens downward, is congruent to $y = x^2$, and has its vertex at $(0, 3)$?

a. $y = (x+3)^2 - 1$
b. $y = -x^2 + 3$
c. $y = -(x-3)^2$
d. $y = x^2 + 3$

____ 8. List the sequence of steps required to graph the function $f(x) = -(x+4)^2 - 6$
a. horizontal translation 4 units to the right, vertical compression by a factor of 1, vertical translation 6 units down
b. horizontal translation 4 units to the right, reflection in x-axis, vertical translation 6 units down
c. horizontal translation 4 units to the left, vertical translation 6 units up, reflection in x-axis
d. horizontal translation 4 units to the left, reflection in x-axis, vertical translation 6 units down

____ 9. Which function matches the graph?



a. $f(x) = -2(x-3)^2 + 1$
b. $f(x) = 2(x+3)^2 - 1$
c. $f(x) = (x+3)^2 + 2$
d. $f(x) = \frac{1}{2}(x-3)^2 - 1$

____ 10. Consider a parabola P that is congruent to $y = x^2$, opens upward, and has vertex $(-1, 3)$. Now find the equation of a new parabola that results if P is reflected in the x-axis and translated 3 units down.
a. $y = -(x+4)^2 + 3$
b. $y = (x-1)^2 + 6$
c. $-(x+1)^2$
d. $-(x-2)^2 + 3$

____ 11. The graphs of $y = x^2$ and another parabola are shown below. What is a possible equation for the second parabola?