quadratic review

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

____ 1. Which of the quadratic functions has the widest graph?
a. $y = \frac{1}{3}x^2$ b. $y = -4x^2$ c. $y = 0.3x^2$ d. $y = -\frac{4}{5}x^2$

____ 2. Order the group of quadratic functions from widest to narrowest graph.
$y = -7x^2,\ y = -\frac{1}{5}x^2,\ y = -\frac{1}{3}x^2$
a. $y = -\frac{1}{3}x^2,\ y = -\frac{1}{5}x^2,\ y = -7x^2$
b. $y = -\frac{1}{5}x^2,\ y = -\frac{1}{3}x^2,\ y = -7x^2$
c. $y = -7x^2,\ y = -\frac{1}{3}x^2,\ y = -\frac{1}{5}x^2$
d. $y = -\frac{1}{5}x^2,\ y = -7x^2,\ y = -\frac{1}{3}x^2$

____ 3. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of the function.
$y = 4x^2 + 5x - 1$
a. $x = \frac{5}{8}$; vertex: $\left(\frac{5}{8}, 4\frac{5}{8}\right)$
b. $x = \frac{5}{8}$; vertex: $\left(\frac{5}{8}, 3\frac{11}{16}\right)$
c. $x = -\frac{5}{8}$; vertex: $\left(-\frac{5}{8}, -5\frac{11}{16}\right)$
d. $x = -\frac{5}{8}$; vertex: $\left(-\frac{5}{8}, -2\frac{9}{16}\right)$

____ 4. A ball is thrown into the air with an upward velocity of 36 ft/s. Its height *h* in feet after *t* seconds is given by the function $h = -16t^2 + 36t + 9$.
a. In how many seconds does the ball reach its maximum height? Round to the nearest hundredth if necessary.
b. What is the ball's maximum height?
a. 1.13 s; 69.75 ft b. 1.13 s; 29.25 ft c. 1.13 s; 31.5 ft d. 2.25 s; 9 ft

____ 5. Dalco Manufacturing estimates that its weekly profit, *P*, in hundreds of dollars, can be approximated by the formula $P = -3x^2 + 6x + 10$, where *x* is the number of units produced per week, in thousands.
a. How many units should the company produce per week to earn the maximum profit?
b. Find the maximum weekly profit.

a. 1,000 units; $1300
b. 3,000 units; $100
c. 1,000 units; $600
d. 2,000 units; $1100

____ 6. Identify the vertex and the *y*-intercept of the graph of the function $y = -3(x + 2)^2 + 5$.
a. vertex: (–2, 5); *y*-intercept: –7
b. vertex: (2, –5); *y*-intercept: –12
c. vertex: (2, 5); *y*-intercept: –7
d. vertex: (–2, –5); *y*-intercept: 9

____ 7. Write $y = 2x^2 + 12x + 14$ in vertex form.
a. $y = 2(x + 12)^2 + 14$
b. $y = 6(x + 9)^2 - 4$
c. $y = (x + 3)^2 + 14$
d. $y = 2(x + 3)^2 - 4$

Write the equation of the parabola in vertex form.

____ 8. vertex (–4, 3), point (4, 131)

a. $y = 2(x + 4)^2 + 3$
c. $y = 4(x - 4)^2 + 3$
b. $y = 2(x - 4)^2 + 3$
d. $y = 131(x + 4)^2 - 3$

Factor the expression.

____ 9. $-15x^2 - 21x$

a. $x(-15x - 21)$
c. $-3x(5x + 7)$
b. $-15x(x + 7)$
d. $5x(x - 3 + 7)$

____ 10. $8x^2 + 12x - 16$

a. $-2(-4x^2 + 12x - 16)$
c. $8x(-2x - 3)$
b. $8x^2 + 12x - 16$
d. $-4(-2x^2 - 3x + 4)$

____ 11. $x^2 + 14x + 48$

a. $(x + 6)(x - 8)$
c. $(x - 8)(x - 6)$
b. $(x + 8)(x - 6)$
d. $(x + 6)(x + 8)$

____ 12. $x^2 - 6x + 8$

a. $(x + 4)(x + 2)$
c. $(x - 4)(x + 2)$
b. $(x - 2)(x - 4)$
d. $(x - 2)(x + 4)$

____ 13. Use a graphing calculator to solve the equation $8x^2 - 5x - 10 = 0$. If necessary, round to the nearest hundredth.

a. 1.16, –1.16
c. 2.95, –1.7
b. 1.47, –0.85
d. 0.85, –1.47

Rewrite the equation in vertex form.

____ 14. $y = x^2 + 10x + 16$

a. $y = (x + 5)^2 + 41$
c. $y = (x + 10)^2 + 11$
b. $y = (x + 10)^2 - 9$
d. $y = (x + 5)^2 - 9$

Find a quadratic model for the set of values.

____ 15. (–2, 8), (0, –4), (4, 68)

a. $y = 4x^2 + 2x - 4$
c. $y = 2x^2 + 4x - 4$
b. $y = 4x^2 + 2x - 4$
d. $y = -4x^2 - 2x + 4$

____ 16.

x	–2	0	4
$f(x)$	1	–3	85

a. $y = 3x^2 + 6x - 4$
c. $y = 4x^2 + 6x - 3$

b. $y = -4x^2 - 6x + 3$

d. $y = 6x^2 + 4x - 3$

____ 17. A biologist took a count of the number of migrating waterfowl at a particular lake, and recounted the lake's population of waterfowl on each of the next six weeks.

Week	0	1	2	3	4	5	6
Population	585	582	629	726	873	1,070	1,317

a. Find a quadratic function that models the data as a function of *x*, the number of weeks.

b. Use the model to estimate the number of waterfowl at the lake on week 8.

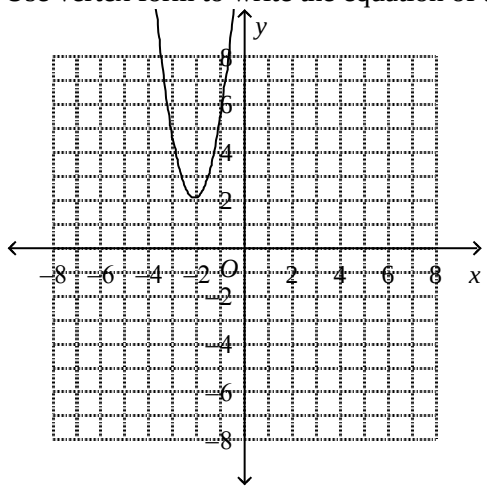
a. $P(x) = 25x^2 - 28x + 585$; 1,614 waterfowl
b. $P(x) = 30x^2 + 28x + 535$; 2,679 waterfowl
c. $P(x) = 25x^2 - 28x + 585$; 1,961 waterfowl
d. $P(x) = 30x^2 + 28x + 535$; 2,201 waterfowl

____ 18. A manufacturer determines that the number of drills it can sell is given by the formula $D = -3p^2 + 180p - 285$, where *p* is the price of the drills in dollars.

a. At what price will the manufacturer sell the maximum number of drills?
b. What is the maximum number of drills that can be sold?

a. \$60; 285 drills
b. \$30; 2,415 drills
c. \$31; 2,418 drills
d. \$90; 8,385 drills

____ 19. Use vertex form to write the equation of the parabola.



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

Short Answer

20. Use the graph of $y = (x - 3)^2 + 5$.

a. If you translate the parabola to the right 2 units and down 7 units, what is the equation of the new parabola in vertex form?

b. If you translate the original parabola to the left 2 units and up 7 units, what is the equation of the new parabola in vertex form?

c. How could you translate the new parabola in part (a) to get the new parabola in part (b)?