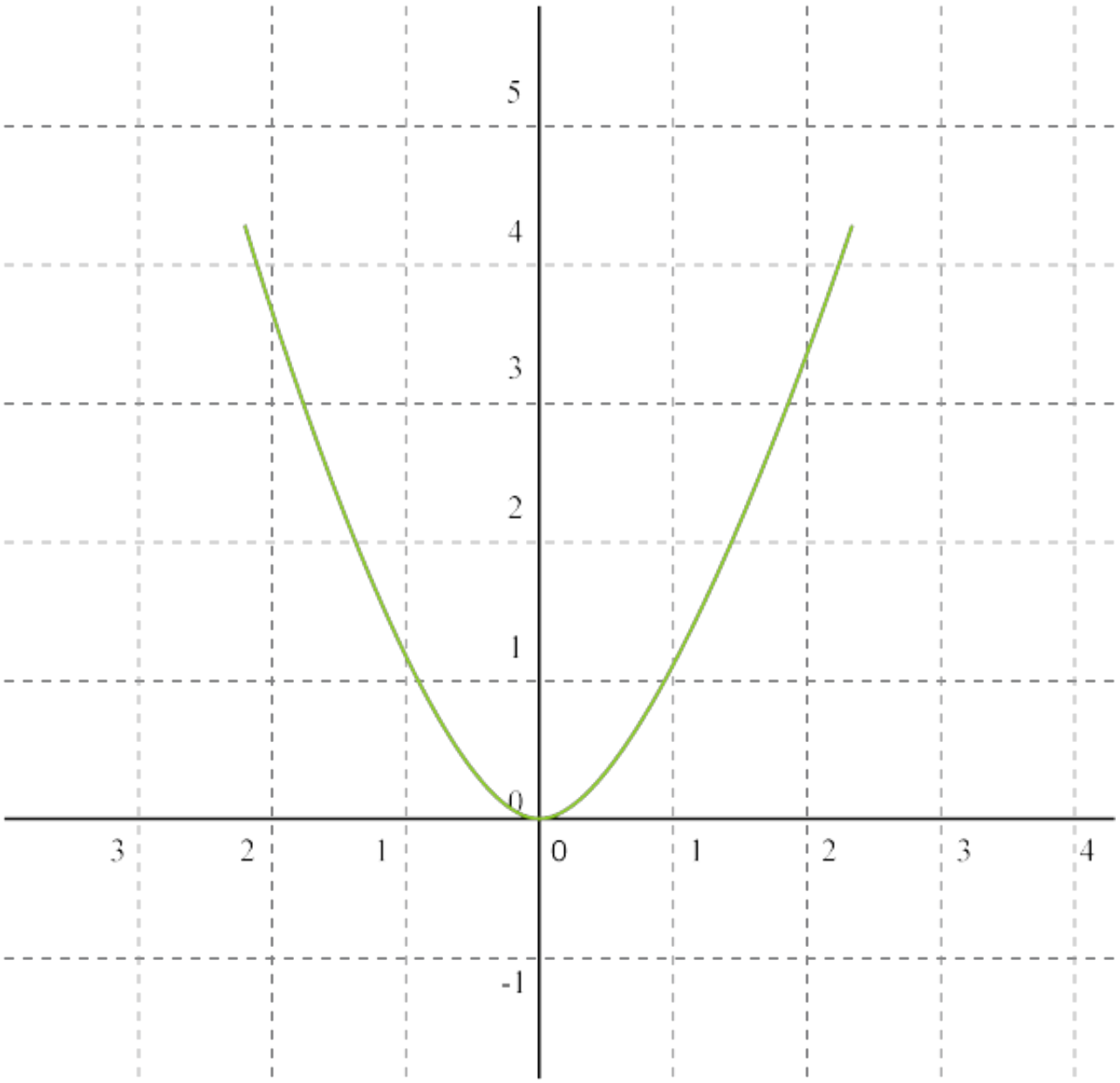
## Ninth Grade - Quadratic Functions

1) Identify the vertex of the graph. Tell whether it is a minimum or maximum.



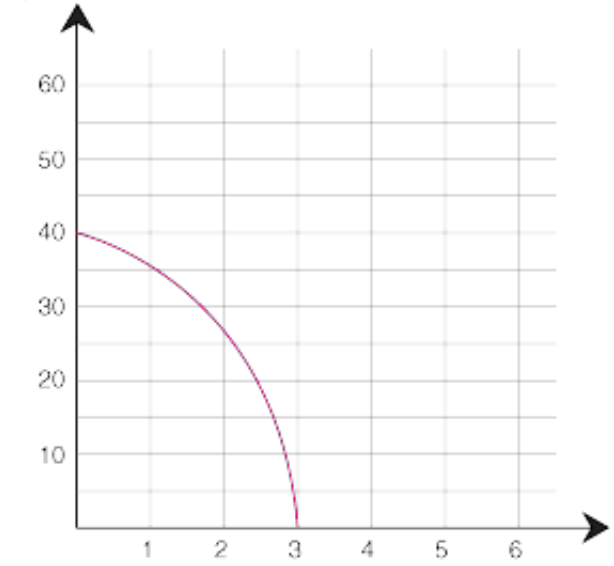

- (0, 0) minimum
- (0, 1) maximum
- (0, 1) minimum
- (0, 0) maximum

2) Which of the quadratic functions has the narrowest graph?

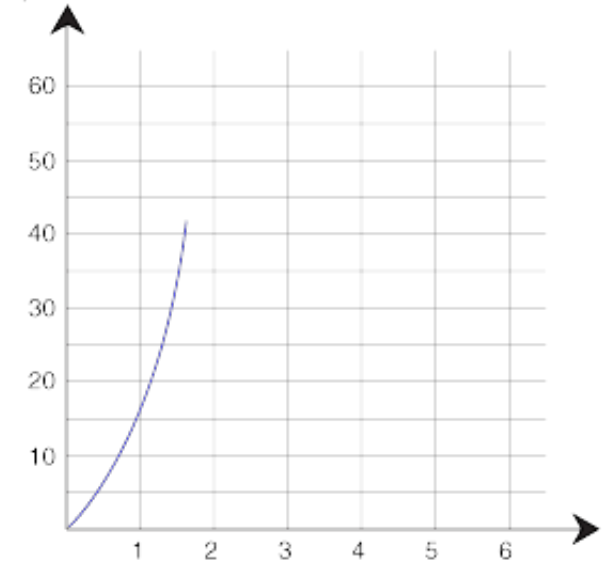
- $y = -3x^2$
- $y = 1/3x$
- $y = 1/7x^2$
- $y = -4x^2$

3) If an object is dropped from a height of 39 feet, the function $h(t) = ?16t^2 + 39$ gives the height of the object after t seconds. Graph the function.

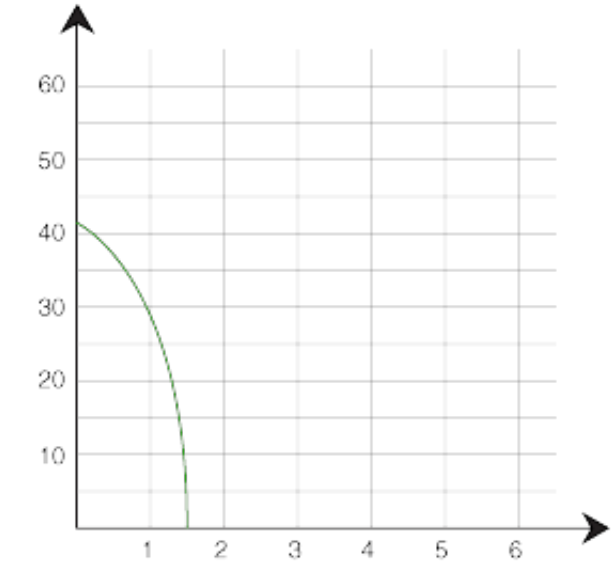
A)



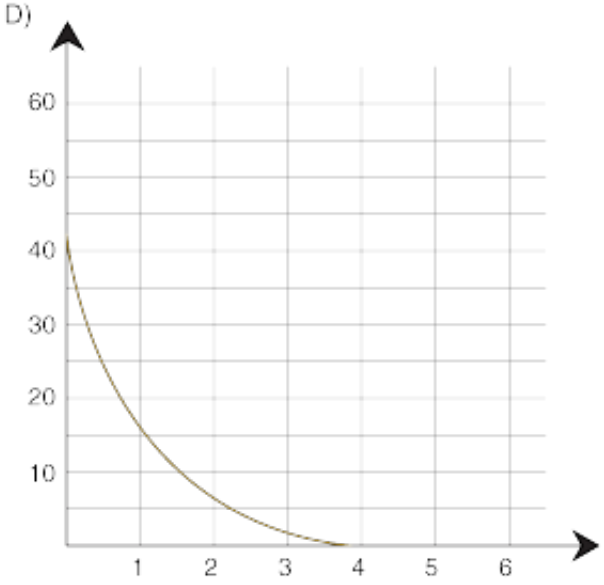

B)




C)




D)




- b
- a
- c
- d

4) A ball is thrown into the air with an upward velocity of 48 ft/s. Its height h in feet after t seconds is given by the function $h = ?16t^2 + 48t + 8$. In how many seconds does the ball reach its maximum height? Round to the nearest hundredth if necessary. What is the ball's maximum height?

- 1.5 secs, 116 ft
- 3 secs, 8 ft
- 1.5 secs, 44 ft
- 1.5 secs, 56 ft

5) Solve the equation: $x^2 – 15 = 34$

- 7
- ±49
- No real number solutions
- ±7

6) Solve $(x - 8)(4x + 2) = 0$ using the Zero Product Property.

- x = 8, -1/2
- x = -8, -1/2
- x = -8, 1/2
- x = 8, 1/2

7) Solve the equation by factoring: $z^2 ? 4z ?12 = 0$

- z = -6, 2
- z = -6, -2
- z = 6, 2
- z = 6,-2

8) Solve the equation by completing the square: $x^2 + 2x - 6 = 0$

- - 8, 6
- 1.86, - 3.86
- 2.24, 2.65
- -1.65, - 3.65

9) Use the Quadratic Formula to solve the following equations. $2a^2 - 46a + 252 = 0$

- 18, 28
- - 9, - 14
- - 18, 28
- 9, 14

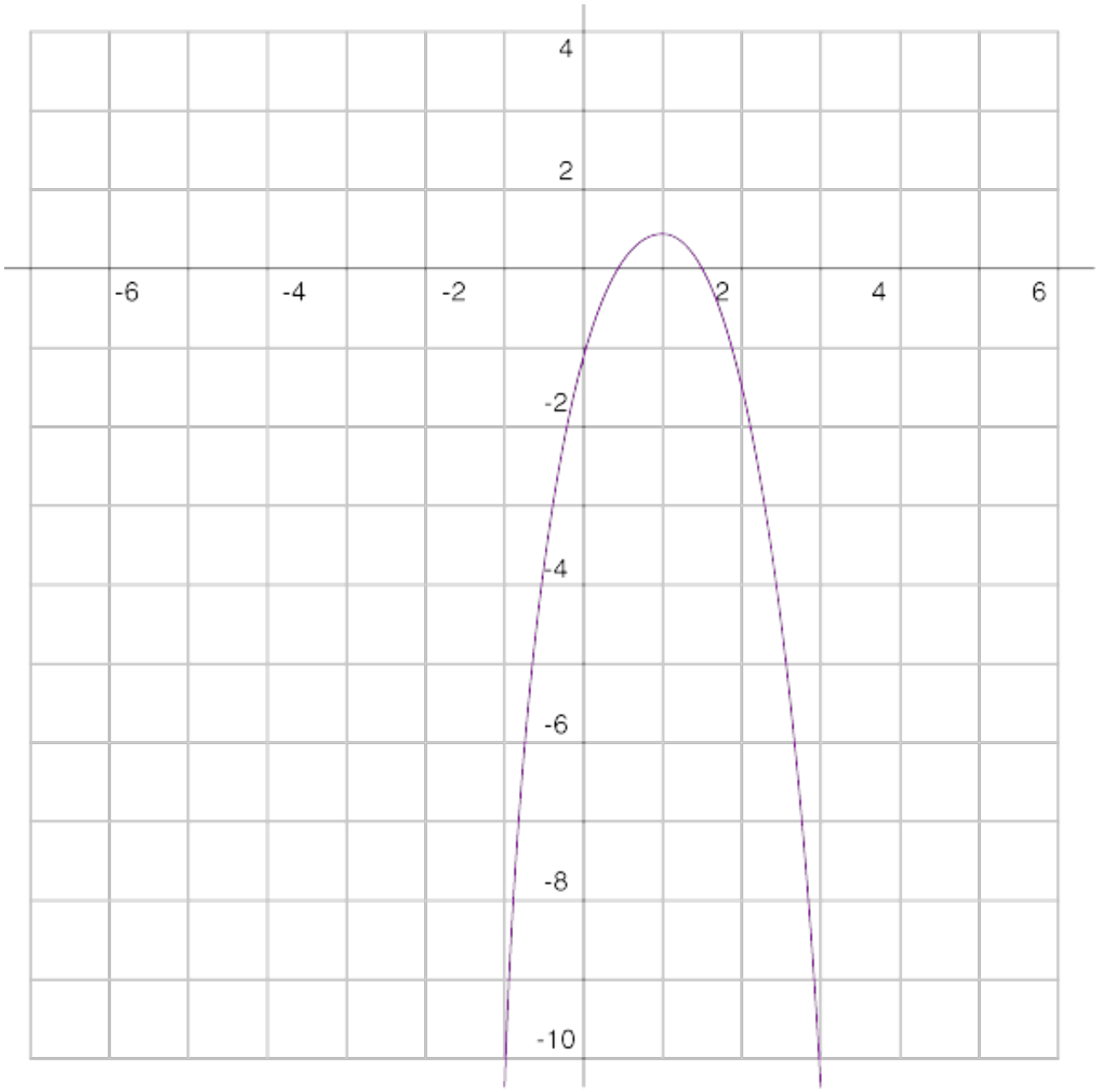
10) Use the Quadratic Formula to solve the following equations. $x^2 + 6x + 18 = 0$

- -3 ± 3.3
- 0 , -6
- -3 ±?-3
- No solution

11) A rocket is launched from a top of 56-foot cliff with an initial velocity of 135 ft/s. Substitute the values into the vertical motion formula $h = - 16t^2 + vt + c$. Let $h = 0$. Use the quadratic formula find out how long the rocket will take to hit the ground after it is launched. Round to the nearest tenth of a second.

- 4.8 s
- $0 = - 16t^2 + 56t + 135$; 0.4 s
- $0 = - 16t^2 + 135t + 56$; 4.8 s
- $0 = - 16t^2 + 56t + 135$; 8.8 s

12) For which discriminant is the graph possible?




- None of these
- $b^2 - 4ac = -9$
- $b^2 - 4ac = 0$
- $b^2 - 4ac = 4$

13) Find the number of real solutions for the following equations. $x^2 - 12x + 36 = 0$

- 2
- 0
- None of these
- 1

14) Find the number of real solutions for the following equations. $x^2 - 5 = 0$

- 20
- 1
- None of these
- 0

15) Use the following functions to answer the questions: f(x) = 3x ? 2, g(x) = $3x^2$ + 2x? 1, h(x) = 4x + 8 and k(x) = $2x^2$ – x ? 9. Find (f/h)when x = 2.

- 1/4
- 4
- 1
- 2

16) Use the following functions to answer the questions : f(x) = 3x - 2, g(x) = $3x^2$ + 2x-1, h(x) = 4x + 8 and k(x) = $2x^2$ - x - 9.17. Find f(x) × h(x).

- $12x^2 + 32x - 16$
- $12x^2 - 16$
- $12x^2 + 32x + 16$
- $12x^2 + 16x - 16$

17) Use the following functions to answer the next set of questions : f(x) = 3x - 2, g(x) = $3x^2$ + 2x -1, h(x) = 4x + 8 and k(x) = $2x^2$ - x - 9. Find g(x) + k(x).

- $5x^2 + x -10$
- $-x^2 - 3x - 8$
- $-5x^2 - x +10$
- $x^2 + 3x +8$

18) Use the following functions to answer the next set of questions : f(x) = 3x ? 2, g(x) = $3x^2$ + 2x ?1, h(x) = 4x + 8 and k(x) = $2x^2$ – x ? 9. Find (g - k)(3)

- 24
- 38
- 26
- 86

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

- x = 5/8, Vertex : (5/8, 59/16)
- x = -5/8, Vertex : (-5/8, -91/16)
- x = 5/8, Vertex : (5/8, 37/8)
- x = -5/8, Vertex : (5/8,-41/16)

20) Suppose you have 56 feet of fencing to enclose a rectangular dog pen. The function A = 28x - $x^2$, where x = width, gives you the area of the dog pen in square feet. What width gives you the maximum area? What is the maximum area? Round to the nearest tenth as necessary.

- Width = 14ft; Area = 196$ft^2$
- Width = 28ft; Area = 420$ft^2$
- Width = 28ft; Area = 196$ft^2$
- Width = 14ft; Area = 588$ft^2$

21) Solve the equation: $x^2$ + 20 = 4

- 24
- ± 24
- -4
- No real number solutions

22) Find the zeros of the function h(x)= $x^2$ -15x + 50 by factoring

- x = 10 or 5
- x = -2 or - 25
- x = -10 or -5
- x = 2 or 25

23) Find the vertex of the graph of the quadratic function : $y = x^2 - 3$

- (0,-3)
- (3,0)
- (-3,0)
- (0,3)

24) Identify the vertex of the quadratic function : $f(x) = (x - 4)^2 - 5$

- (-5,0)
- (4,-5)
- (0,4)
- (-5,4)

25) Find the equation of the quadratic function that has the given vertex and given point on its graph.
Vertex: (-4,-4) point: (-3,-5)

- $P(x) = -x^2 + 4x - 4$
- $P(x) = x^2 + 8x - 4$
- $P(x) = x^2 + 8x + 4$
- $P(x) = -x^2 - 8x - 20$

26) Find the equation of the axis of symmetry of the quadratic function: $y = (x + 1)^2 + 8$

- y = 0
- x = -1
- y = -1
- x =1

27) Find the maximum or minimum point of the function $f(x) = x^2 + 14x + 40$ and state whether it is a maximum or minimum

- (-9,0); minimum
- (-7,-9); minimum
- (0,-7); maximum
- (-9,-7); maximum

28) Solve the equation $10z^2 + 3z - 3 = 0$

$$a)\ \frac{-3 \pm \sqrt{129}}{20} \quad b)\ \frac{-5 \pm \sqrt{149}}{10} \quad c)\ \frac{-2 \pm \sqrt{139}}{30} \quad d)\ \frac{-4 \pm \sqrt{124}}{24}$$

- a
- c
- d
- b

29) Evaluate the discriminant, and predict the type and number of solutions of $s^2 + 3s + 8 = 0$

- 0, one rational
- 23, two different rational
- -23, two different imaginary
- 23, two different irrational

30) Write a quadratic equation in the form $ax^2 + bx + c = 0$ that has the solutions(roots)5,and -3

- $x^2 - 2x - 15 = 0$
- $x^2 - 15x - 2 = 0$
- $x^2 + 2x - 15 = 0$
- $x^2 - 15x + 2 = 0$