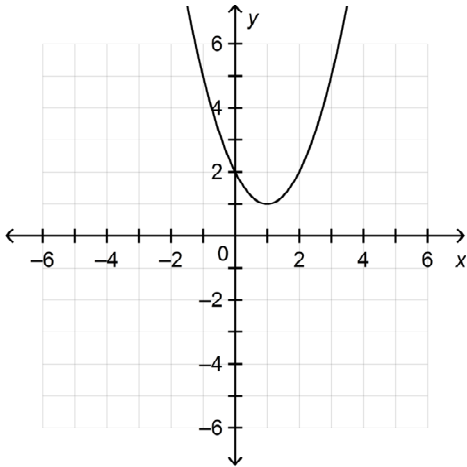


PreCalc 11 Chapter 4 Review Pack v1**Multiple Choice**

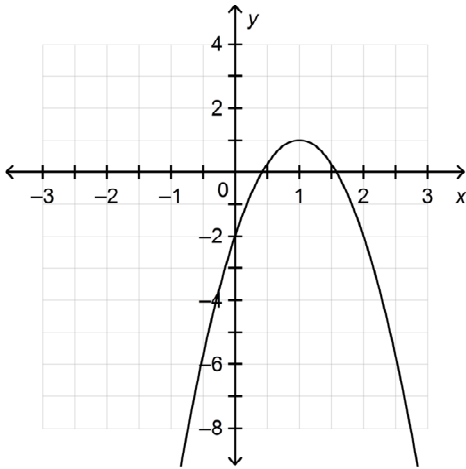
Identify the choice that best completes the statement or answers the question.

- _____ 1. Which statement below is NOT true for the graph of a quadratic function?
- A. The vertex of a parabola is its highest or lowest point.
 - B. When the coefficient of x^2 is positive, the vertex of the parabola is a minimum point.
 - C. The axis of symmetry intersects the parabola at the vertex.
 - D. The parabola is symmetrical about the y -axis.
- _____ 2. What are the coordinates of the vertex of this graph of the quadratic function $y = x^2 - 2x + 2$? State whether it is a maximum point or a minimum point.



- A. (1, 1); minimum point
 - B. (1, 1); maximum point
 - C. (1, 2); maximum point
 - D. (1, 2); minimum point
- _____ 3. Use a graphing calculator to determine the x -intercepts of the quadratic function $y = -9x^2 - 7x + 10$. Write the intercepts to the nearest hundredth, if necessary.
- A. -1.51 and 0.73
 - B. -0.73 and 1.51
 - C. -1.12 and 1.12
 - D. -3.02 and 1.47
- _____ 4. A rectangular dog pen is to be enclosed with 20 m of fencing. The area of the dog pen, A square metres, is modelled by the function $A = 10x - x^2$, where x is the width, in metres. What is the width that gives maximum area? Write the answer to the nearest tenth, if necessary.
- A. 5 m
 - B. 25 m
 - C. 20 m
 - D. 10 m

- _____ 5. The graph of a quadratic function is shown. Which of the numbers below could be the discriminant of the corresponding quadratic equation?



- A. 10
B. -1
C. 0
D. None of the above
- _____ 6. Use graphing technology to approximate the solution of this equation: $-2x^2 - 8x - 7 = 0$
Write the roots to 1 decimal place.
A. The roots are approximately $x = -5.4$ and $x = -2.6$.
B. The roots are approximately $x = -2.7$ and $x = -1.3$.
C. The roots are approximately $x = 1.3$ and $x = 2.7$.
D. The roots are approximately $x = -0.7$ and $x = 0.7$.
- _____ 7. Which of the following describes the translation that would be applied to the graph of $y = x^2$ to get the graph of $y = (x - 4)^2$?
A. Translate 4 units right
B. Translate 4 units left
C. Translate 4 units up
D. Translate 4 units down
- _____ 8. Which statement is NOT true for the graph of $y = x^2 + q$?
A. When q is positive, the graph lies above the x -axis.
B. As q increases, the graph moves up.
C. When q is negative, the vertex is above the x -axis.
D. The graph has the same size and shape as the graph of $y = x^2$.

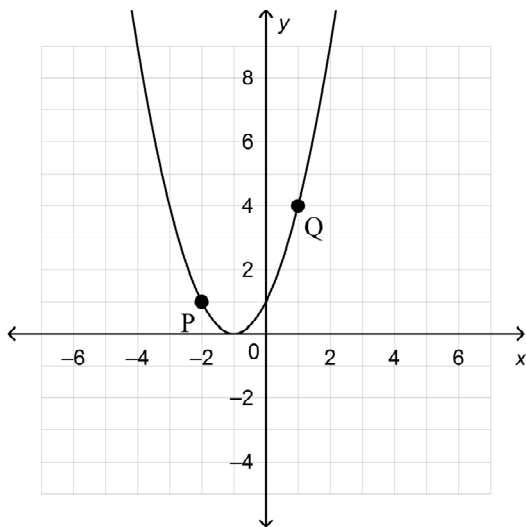
_____ 9. Which statement is NOT true for the graph of $y = (x - p)^2$?

- A. When $p = 0$, the vertex is at the origin.
- B. The graph has the same size and shape as the graph of $y = x^2$.
- C. When p is negative, the vertex is on the negative x -axis.
- D. As p increases, the graph moves to the left.

_____ 10. Which statement is NOT true for the graph of $y = ax^2$?

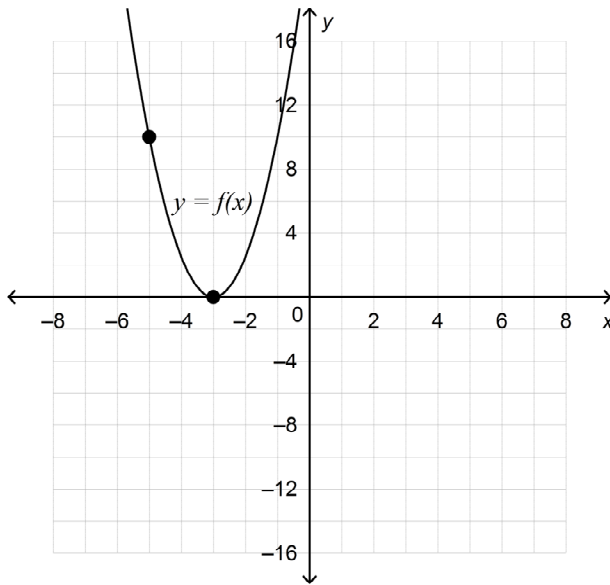
- A. When a is greater than 1, the graph is the image of the graph of $y = x^2$ after a vertical stretch.
- B. When $0 < a < 1$, the graph is the image of the graph of $y = x^2$ after a vertical compression and a reflection in the x -axis.
- C. The vertex of the graph is always at the origin.
- D. When a is less than -1 , the graph is the image of the graph of $y = x^2$ after a vertical stretch and a reflection in the x -axis.

_____ 11. Identify the coordinates of the vertex, the axis of symmetry, and the coordinates of points P and Q on the graph of this quadratic function.



- A. vertex: $(-1, 0)$; line of symmetry: $x = -1$; $P(0, 1)$, $Q(0, 1)$
- B. vertex: $(-1, 0)$; line of symmetry: $x = -1$; $P(-2, 1)$, $Q(1, 4)$
- C. vertex: $(0, -1)$; line of symmetry: $x = 0$; $P(-2, 1)$, $Q(4, 1)$
- D. vertex: $(0, -1)$; line of symmetry: $x = 0$; $P(0, 1)$, $Q(1, 0)$

_____ 12. Determine an equation of this graph of a quadratic function.



- A. $y = 2.5(x - 3)^2 - 2$ C. $y = -2.5(x + 3)^2 - 2$
 B. $y = 2.5(x + 3)^2$ D. $y = 2.5(x + 3)^2 - 2$

_____ 13. Write this equation in standard form: $y = \frac{3}{5}x^2 + 30x + 382$

- A. $y = \frac{3}{5}(x + 25)^2 + 7$ C. $y = \frac{3}{5}(x + 5)^2 + \frac{21}{5}$
 B. $y = (\frac{3x}{5} + 25)^2 + 7$ D. $y = (x + 30)^2 + 518$

_____ 14. Determine the number that would be added to $x^2 + 10x$ to get a perfect square trinomial.

- A. 625 B. 25 C. 10 D. 100

_____ 15. Determine the number that would be added to $x^2 - 12x$ to get a perfect square trinomial.

- A. 36 B. 1296 C. 144 D. 12

_____ 16. A quadratic function has zeros -3 and 8 . What is the equation of the axis of symmetry of its graph?

- A. $x = 2.5$ B. $x = -5.5$ C. $x = -2.5$ D. $x = 5.5$

_____ 17. Determine the zeros of this quadratic function: $y = x^2 - 4x - 32$

- A. -4 and 8 B. 4 and -8 C. 4 and 8 D. -4 and -8

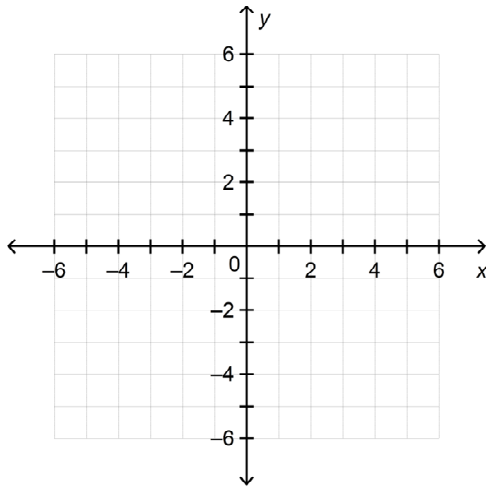
- _____ 18. Determine the coordinates of the vertex of the graph of this quadratic function: $y = -4x^2 + 10x - 4$
A. (1.25, 4.5) B. (-2.5, 4.5) C. (1.25, 2.25) D. (-2.5, 2.25)
- _____ 19. Determine the x -intercepts, the equation of the axis of symmetry, and the coordinates of the vertex of the graph of $y = -x^2 - 2x + 3$
A. x -intercepts: 3 and -1 ; axis of symmetry: $x = -1$; vertex: $(-1, -4)$
B. x -intercepts: -3 and -1 ; axis of symmetry: $x = -1$; vertex: $(-1, -4)$
C. x -intercepts: 3 and 1; axis of symmetry: $x = 1$; vertex: $(1, 4)$
D. x -intercepts: -3 and 1; axis of symmetry: $x = -1$; vertex: $(-1, 4)$
- _____ 20. A sports equipment company sells skates for \$65 a pair. At this price, the company sells approximately 200 pairs a week. For every increase in price of x dollars, the company will sell $40x$ fewer pairs. Determine the equation that should be used to maximize the revenue, R dollars.
A. $R = (65 - x)(100 + 40x)$ C. $R = (65 + x)(200 - 20x)$
B. $R = (65 + x)(200 - 40x)$ D. $R = (65 + x)(100 - 40x)$
- _____ 21. Two numbers have a difference of 12 and their product is a minimum. Determine the numbers.
A. -6 and 6 B. -3 and 9 C. 6 and 18 D. 0 and 12
- _____ 22. Two numbers have a difference of 10. The sum of their squares is a minimum. Determine the numbers.
A. 5 and 15 B. -2 and 8 C. 0 and 10 D. -5 and 5
- _____ 23. A rectangular dog pen is to be fenced with 24 m of fencing. Determine the maximum area and the width of this rectangle.
A. $A = 36 \text{ m}^2$; $w = 12 \text{ m}$ C. $A = 108 \text{ m}^2$; $w = 6 \text{ m}$
B. $A = 84 \text{ m}^2$; $w = 12 \text{ m}$ D. $A = 36 \text{ m}^2$; $w = 6 \text{ m}$

Short Answer

24. Does this table of values represent a linear function, a quadratic function, or neither?

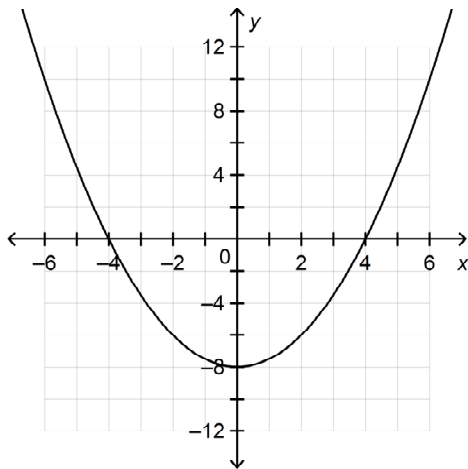
x	0	2	4	6	8
y	4	6	12	22	36

25. Graph the quadratic function $y = x^2 - 2x - 3$. Determine the coordinates of the vertex and the equation of the axis of symmetry.



26. A ball was thrown into the air with an upward velocity of 8 m/s. Its height, h metres, after t seconds is modelled by the equation $h = -5t^2 + 8t + 2$. Use a graphing calculator to answer the questions below. Give your answers to the nearest tenth, if necessary.
- After how many seconds did the ball reach its maximum height?
 - What was the ball's maximum height?

27. Use the graph of $y = \frac{1}{2}x^2 - 8$ to determine the roots of $\frac{1}{2}x^2 - 8 = 0$.



28. Using graphing technology to approximate the solution of this equation: $5x^2 + 9x + 10 = 0$
Write the roots to 1 decimal place.

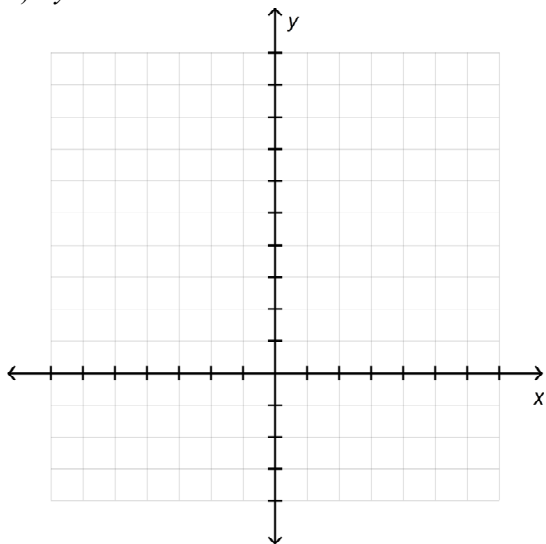
29. Complete this table for the graph of each function.

Function	Direction of opening	Vertex	Axis of Symmetry	Congruent to $y = x^2$?
$y = x^2 + 6$				
$y = 6x^2$				
$y = (x + 2)^2$				
$y = x^2$				
$y = -6x^2$				
$y = (x - 6)^2$				
$y = x^2 - 2$				

30. Graph each quadratic function on the same grid without using a table of values or a graphing calculator.

a) $y = x^2 + 4$

b) $y = x^2 - 3$



31. Use a graphing calculator or graphing software. Graph each quadratic function. How many x -intercepts does the graph have?

a) $y = -2x^2 + 2$

b) $y = -2(x - 1)^2$

c) $y = \frac{4}{9}x^2 + 3$

32. The equation of the axis of symmetry of the graph of a quadratic function is $x = 3$. The graph passes through the points R(3, 7) and T(-1, -25). Determine an equation of the function.
33. Determine the number that would be added to $x^2 + \frac{11}{2}x$ to get a perfect square trinomial. Add the number, then factor the trinomial.
34. Write $y = 2x^2 + 21x + 54$ in standard form, then identify the coordinates of the vertex.
35. The graph of a quadratic function passes through A(3, 12) and has x -intercepts 1 and 5. Write an equation of the graph in factored form.
36. The graph of a quadratic function passes through B(4, 6), and the zeros of the function are 5 and 6. Write an equation of the graph in general form.
37. Does the quadratic function $y = -\frac{1}{5}(x + 5)^2 - 2$ have a maximum value or a minimum value? What is that value?
38. The weekly profit of a manufacturer, P hundreds of dollars, is modelled by the equation $P = -2x^2 + 8x + 8$, where x is the number of units produced per week, in thousands.
- How many units should the manufacturer produce per week to maximize profit?
 - What is the maximum weekly profit?
39. A rectangular lot is bordered on one side by a building and the other 3 sides by 300 m of fencing. Determine the area of the largest lot possible.

Problem

40. Identify whether each table of values represents a linear function, a quadratic function, or neither. Explain how you know.

a)

x	-4	-2	0	2	4
y	-6	-2	2	6	10

b)

x	-4	-2	0	2	4
y	42	10	2	18	58

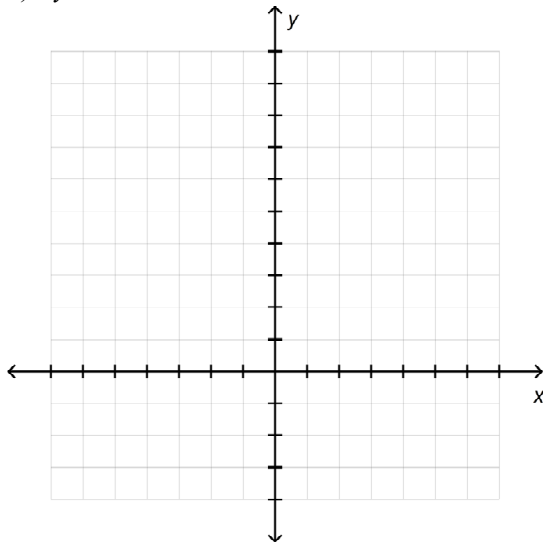
41. A toy rocket is launched from a platform. The height of the rocket, h metres, t seconds after launch is modelled by the equation $h = -4.9t^2 + 28t + 3$.

- Use a graphing calculator to graph the quadratic function.
- Determine the t -intercepts of the graph, to the nearest hundredth. What do they represent?
- To the nearest metre, what is the greatest height that the rocket reached? Explain how you know.
- What is the domain? What does it represent?

42. Graph each quadratic function on the same grid without using a table of values or a graphing calculator. Explain your strategy each time.

a) $y = x^2 + 1$

b) $y = x^2 - 2$



43. The arch of a bridge forms a parabola. The arch is 72 m wide and its maximum height is 27 m above its base. Determine an equation to model this parabola. Explain your strategy.
44. The standard form of the equation of a quadratic function is $y = a(x - p)^2 + q$, with the vertex of the graph of the function at the point (p, q) . The factored form is $y = a(x - x_1)(x - x_2)$, where x_1 and x_2 are the x -intercepts of the graph. Express p and q in terms of x_1 and x_2 by expanding the factored form, then completing the square.
45. A trough has a parabolic cross section. It is 12 m wide at the top. At a point 3 m from its top edge, the trough is 4.5 m deep.
- Determine an equation to represent the cross section of the trough.
 - What is the greatest depth of the trough?
- Explain your work.
46. A toy rocket is launched from a platform. Its height, h metres, after t seconds is modelled by the equation $h = -4.9t^2 + 20t + 2$. Use a graphing calculator to determine the maximum height of the rocket and the amount of time the rocket was in the air.
47. Maribel is building rectangular pens for her dogs, as shown below. She will fence the entire rectangular area with 78 m of fencing. What dimensions enclose the total maximum area? Show your work.

