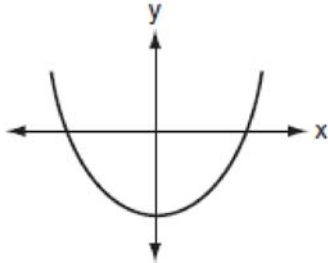
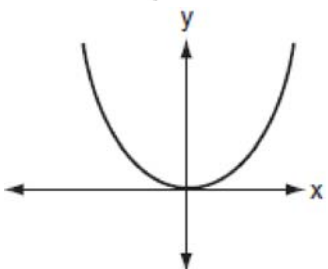


A2.A.2: Using the Discriminant 3: Use the discriminant to determine the nature of the roots of a quadratic equation

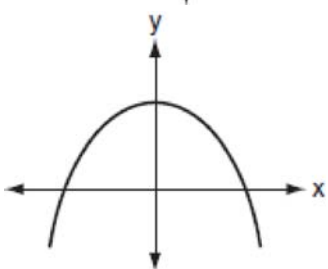
- 1 Which graph represents a quadratic function with a negative discriminant?



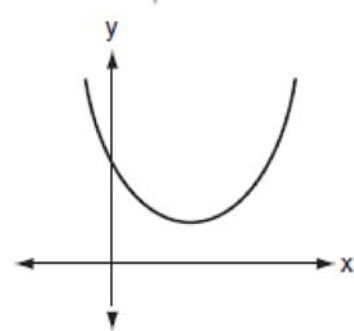
1)



2)

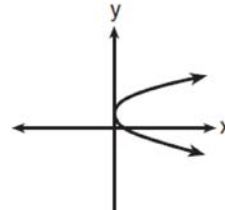


3)

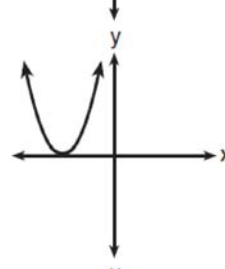


4)

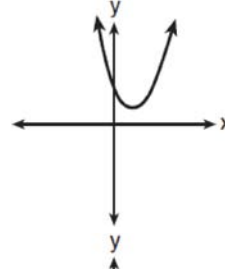
- 2 If zero is the value of the discriminant of the equation $ax^2 + bx + c = 0$, which graph best represents $y = ax^2 + bx + c$?



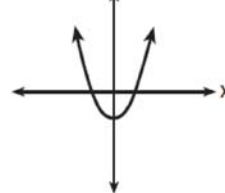
1)



2)

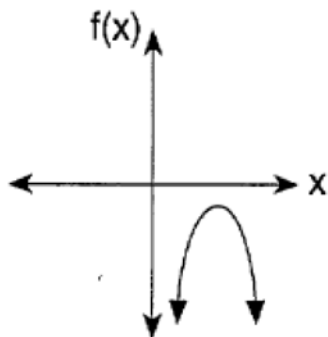


3)



4)

- 3 The accompanying diagram shows a sketch of a quadratic function, $f(x)$.



What is the nature of the roots of the quadratic equation $f(x) = 0$?

- 1) imaginary
 - 2) real, rational, and equal
 - 3) real, rational, and unequal
 - 4) real, irrational, and unequal
- 4 Jacob is solving a quadratic equation. He executes a program on his graphing calculator and sees that the roots are real, rational, and unequal. This information indicates to Jacob that the discriminant is
- 1) zero
 - 2) negative
 - 3) a perfect square
 - 4) not a perfect square
- 5 Which statement must be true if a parabola represented by the equation $y = ax^2 + bx + c$ does *not* intersect the x -axis?
- 1) $b^2 - 4ac = 0$
 - 2) $b^2 - 4ac < 0$
 - 3) $b^2 - 4ac > 0$, and $b^2 - 4ac$ is a perfect square.
 - 4) $b^2 - 4ac > 0$, and $b^2 - 4ac$ is not a perfect square.
- 6 If the roots of $ax^2 + bx + c = 0$ are real, rational, and equal, what is true about the graph of the function $y = ax^2 + bx + c$?
- 1) It intersects the x -axis in two distinct points.
 - 2) It lies entirely below the x -axis.
 - 3) It lies entirely above the x -axis.
 - 4) It is tangent to the x -axis.
- 7 Which is a true statement about the graph of the equation $y = x^2 - 7x - 60$?
- 1) It is tangent to the x -axis.
 - 2) It does not intersect the x -axis.
 - 3) It intersects the x -axis in two distinct points that have irrational coordinates.
 - 4) It intersects the x -axis in two distinct points that have rational coordinates.
- 8 Given the function $y = f(x)$, such that the entire graph of the function lies above the x -axis. Explain why the equation $f(x) = 0$ has no real solutions.

A2.A.2: Using the Discriminant 3: Use the discriminant to determine the nature of the roots of a quadratic equation

Answer Section

1 ANS: 4 REF: 080620b

2 ANS: 2 REF: 011020b

3 ANS: 1 REF: 019735siii

4 ANS: 3 REF: 060103b

5 ANS: 2

If a parabola does not intersect the x -axis, the roots are imaginary, and the discriminant is less than 0.

REF: 010416b

6 ANS: 4

If the roots of the quadratic are equal, the graph of the function intersects the x -axis only once.

REF: 010313b

7 ANS: 4

$$b^2 - 4ac = (-7)^2 - 4(1)(-60) = 289$$

REF: 010713b

8 ANS:

Since the graph lies entirely above the x -axis, there is no point on the graph where $y = 0$.

REF: 080525b