

Algebra 1 · Graphing Quadratic Functions · Quiz

Common Core F-IF.C.7a, F-IF.C.8a, F-IF.B.4, A-SSE.B.3b · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

Try these ten multiple-choice questions on parabolas: axis of symmetry, vertex, zeros, intercepts, completing the square and real-world maximums. Each question has exactly one correct answer, and the explanation shows the common mistake.

Algebra 1 Common Core: **F-IF.C.7a · F-IF.C.8a · F-IF.B.4 · A-SSE.B.3b**

Questions

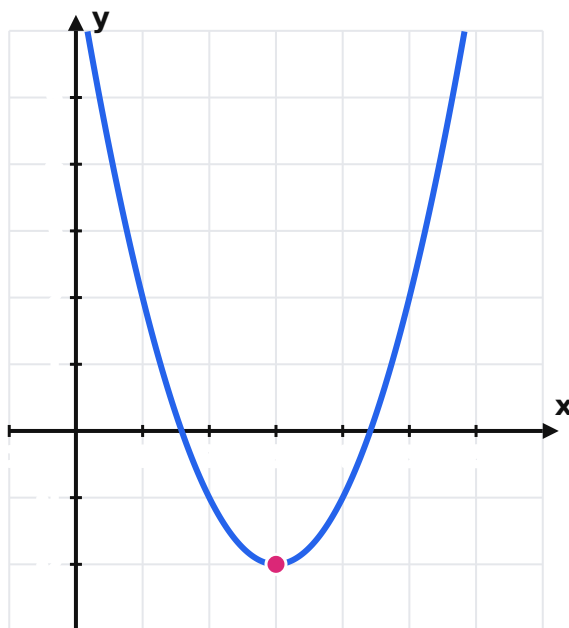
Question 1

What is the axis of symmetry of $y = x^2 - 10x + 7$?

- A. $x = -5$
- B. $x = 10$
- C. $x = 7$
- D. $x = 5$

Question 2

What is the vertex of the parabola shown?



Graph for the question.

- A. $(-3, 2)$
- B. $(3, 2)$
- C. $(3, -2)$
- D. $(-2, 3)$

Question 3

What is the vertex of $y = 2(x+4)^2 - 7$?

- A. $(4, -7)$
- B. $(-4, -7)$
- C. $(-4, 7)$
- D. $(4, 7)$

Question 4

What are the zeros of $y = (x-6)(x+2)$?

- A. $x = -6$ and $x = 2$
- B. $x = 6$ and $x = 2$
- C. $x = 6$ and $x = -2$
- D. $x = -6$ and $x = -2$

Question 5

What is the y-intercept of $y = (x-3)(x+4)$?

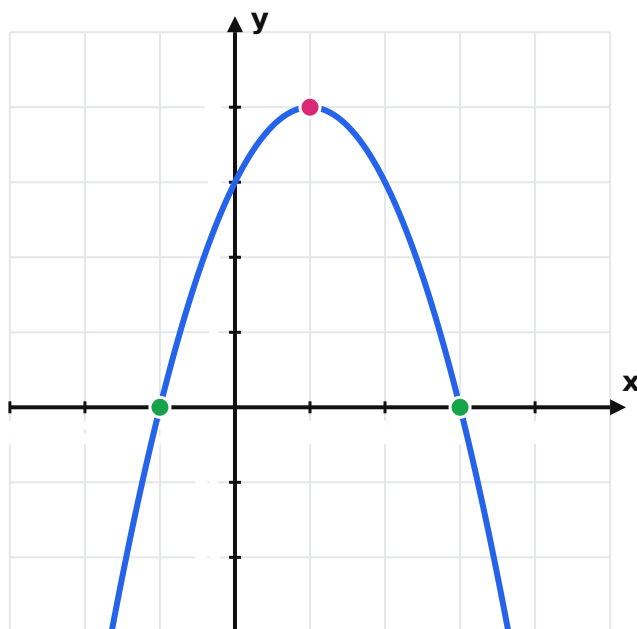
- A. $(0, -12)$
- B. $(0, 12)$

C. $(0, -1)$

D. $(0, 4)$

Question 6

Which equation matches the graph?



Graph for the question.

A. $y = (x-1)^2 + 4$

B. $y = -(x-1)^2 + 4$

C. $y = -(x+1)^2 + 4$

D. $y = -(x-1)^2 - 4$

Question 7

Complete the square: $x^2 + 12x + 5$ equals

A. $(x+6)^2 - 31$

B. $(x+6)^2 + 41$

C. $(x+6)^2 + 5$

D. $(x+12)^2 - 139$

Question 8

What is the minimum value of $f(x) = x^2 - 8x + 19$?

A. 4

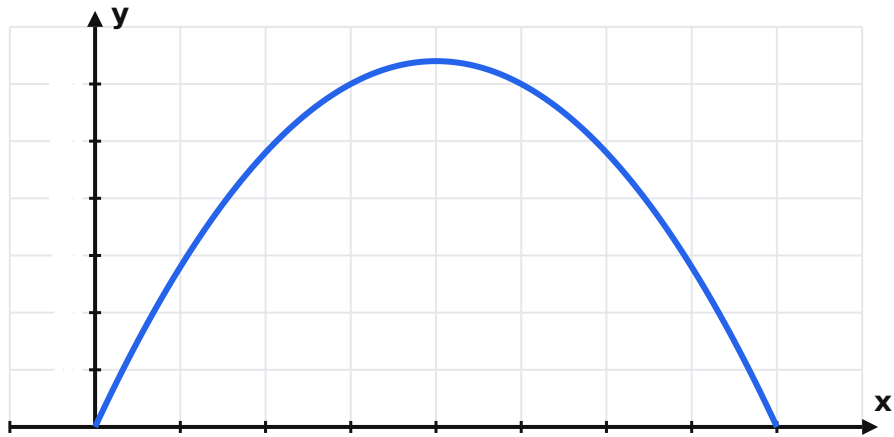
B. 19

C. -3

D. 3

Question 9

The graph shows the height in feet of a ball after t seconds. When does the ball return to the ground?



Graph for the question.

- A. $t = 4$ s
- B. $t = 2$ s
- C. $t = 8$ s
- D. $t = 64$ s

Question 10

A rectangular pen has a perimeter of 60 feet. What is the largest area it can have?

- A. 450 ft^2
- B. 900 ft^2
- C. 200 ft^2
- D. 225 ft^2

Answer key

1. **D** - The axis is $x = -\frac{b}{2a} = \frac{10}{2} = 5$. Forgetting the minus sign gives $x = -5$.
2. **C** - The lowest point is at $x = 3$, $y = -2$. Swapping the coordinates gives $(-2, 3)$.
3. **B** - Write $x + 4$ as $x - (-4)$, so $h = -4$ and $k = -7$. The sign inside the parentheses is the opposite of h .
4. **C** - Each factor equals 0 at a zero: $x - 6 = 0$ gives 6 and $x + 2 = 0$ gives -2 .
5. **A** - At $x = 0$, $y = (-3)(4) = -12$. The zeros are 3 and -4 , not the y-intercept.
6. **B** - The vertex is $(1, 4)$ and the graph opens down, so $a < 0$, $h = 1$ and $k = 4$.
7. **A** - Add and subtract $6^2 = 36$: $(x + 6)^2 - 36 + 5 = (x + 6)^2 - 31$. Forgetting to subtract 36 gives $+5$.
8. **D** - The vertex is at $x = 4$, and $f(4) = 16 - 32 + 19 = 3$. The value 4 is where the minimum occurs, not the minimum itself.
9. **A** - The graph reaches 0 again at $t = 4$. It is symmetric about the peak at $t = 2$, so the trip takes twice as long as the climb.
10. **D** - The width and length add to 30. The area $w(30 - w)$ is greatest at $w = 15$, a square: $15 \times 15 = 225$.

Remember:

- Standards F-IF.C.7a, F-IF.C.8a, F-IF.B.4 and A-SSE.B.3b: graph quadratics, rewrite them, and interpret key features.
- The axis of symmetry is $x = -\frac{b}{2a}$, and the vertex lies on it.
- Vertex form $a(x - h)^2 + k$ shows the vertex; factored form $a(x - p)(x - q)$ shows the zeros.
- If $a > 0$ the vertex is a minimum; if $a < 0$ it is a maximum.
- In a projectile model, the vertex gives the maximum height and the positive zero gives the landing time.