

Quadratic Foundations

Basic quadratic structure, intercepts, factoring, and parabola features.

Name _____ Date _____

32 main 2-up grid 3 pages

Completion Reward



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1. Which expression is quadratic?

- A. $2x + 5$
- B. $3(2^x)$
- C. $x/4 + 2$
- D. $x^2 + 3x + 1$

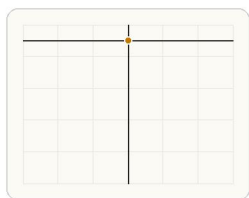
2. If the coefficient of x^2 is positive, which way does the parabola open?

- A. Downward
- B. Left
- C. Right
- D. Upward

3. What do the x-intercepts of a quadratic graph represent?

- A. The x-values where $y = 0$
- B. The highest points of the graph
- C. The slopes of the curve
- D. The values where $x = 1$

4. Based on the graph of $y = -x^2$, which direction does the parabola open?



Use the way the arms move away from the vertex to determine whether the parabola opens up or down.

- A. Upward
- B. Left
- C. Right
- D. Downward

5. A student solves $x^2 = 16$ and says $x = 4$ only. What is wrong?

- A. You should always multiply by 16 first.
- B. Both 4 and -4 square to 16, so there are two solutions.
- C. The only correct answer is $x = -4$.
- D. Quadratic equations never have real solutions.

6. If you want to know whether a parabola has a maximum or a minimum, which feature should you look at?

- A. The y-intercept only
- B. The vertex
- C. The x-axis labels only
- D. The domain

7. Which family best models the area of a square as a function of its side length?

- A. Quadratic
- B. Linear
- C. Exponential
- D. Constant

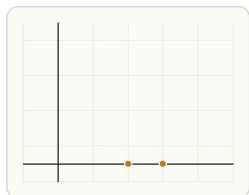
8. Which family is known for constant second differences in a table?

- A. Linear
- B. Exponential
- C. Quadratic
- D. Constant

9. What is the vertex of $y = (x - 2)^2 + 1$?

- A. (2, 1)
- B. (-2, 1)
- C. (2, -1)
- D. (-2, -1)

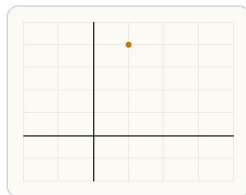
10. What do the x-intercepts of a quadratic graph represent?



Where the graph crosses the x-axis, the output is 0, so those x-values are the zeros of the quadratic.

- A. The slope of the graph
- B. The values where the output equals zero
- C. The y-intercept
- D. The highest point of the graph

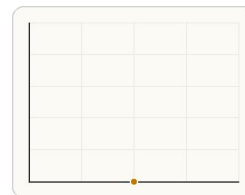
11. What is the maximum value of the parabola?



If the parabola opens downward, its maximum value occurs at the vertex.

- A. 1
- B. 3
- C. 5
- D. 4

12. How many x-intercepts does the parabola have?



A parabola that touches the x-axis at exactly one point has one real x-intercept.

- A. 0
- B. 2
- C. 1
- D. Infinitely many

13. Which equation has zeros at $x = -2$ and $x = 5$?

- A. $y = (x - 2)(x + 5)$
- B. $y = (x + 2)(x - 5)$
- C. $y = (x + 2)(x + 5)$
- D. $y = (x - 2)(x - 5)$

14. Which factored form has roots -1 and 4?

- A. $(x - 1)(x + 4)$
- B. $(x + 1)(x + 4)$
- C. $(x + 1)(x - 4)$
- D. $(x - 1)(x - 4)$

15. What is the best next step to solve $x^2 - x - 12 = 0$?

- A. Factor the quadratic expression.
- B. Add 12 to both sides and stop.
- C. Take the square root of both sides immediately.
- D. Divide both sides by x.

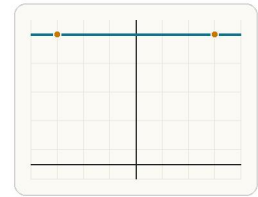
16. After factoring $x^2 + 7x + 10 = 0$ as $(x + 5)(x + 2) = 0$, what should you do next?

- A. Multiply the factors again
- B. Add 5 and 2 to get $x = 7$
- C. Take the square root of each factor
- D. Set each factor equal to 0

17. A student says $x^2 + 9 = (x + 3)^2$. What is wrong?

- A. Squaring a binomial always removes the constant term.
- B. $x^2 + 9$ is actually linear.
- C. The correct factorization is $(x - 3)^2$.
- D. Expanding $(x + 3)^2$ gives $x^2 + 6x + 9$, so the middle term is missing.

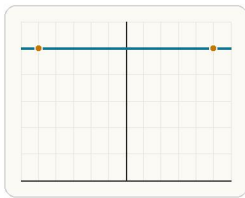
18. A student solves $x^2 = 9$ and says $x = 3$ only. What is wrong?



Both x-values where the parabola meets $y = 9$ satisfy the equation.

- A. They should square both sides again
- B. They forgot that both 3 and -3 square to 9
- C. They should divide by 9
- D. There is no mistake

19. A student solves $x^2 = 25$ and writes $x = 5$ only. What is missing?



The parabola meets $y = 25$ at $x = -5$ and $x = 5$.

- A. You should square both sides again
- B. 25 has no square root
- C. Nothing is missing
- D. x can also be -5

20. Solve $x^2 = 49$.

- A. $x = -7$ or $x = 7$
- B. $x = 7$
- C. $x = -7$
- D. $x = 49$

21. What is the y-intercept of $y = x^2 - 4x + 3$?

- A. 3
- B. -4
- C. 1
- D. 4

22. Which solution set solves $x^2 = 49$?

- A. $x = 7$ only
- B. $x = -49$ or $x = 49$
- C. $x = -7$ or $x = 7$
- D. $x = -14$ or $x = 14$

23. For $y = x^2 - 4x + 3$, what is y when $x = 2$? Answer with a number.

24. Which expression is the factorization of $2x^2 + 8x$?

- A. $2x(x + 4)$
- B. $2(x + 4)$
- C. $x(2x + 8)$
- D. $(2x + 4)^2$

25. Which solution set solves $x(x - 6) = 0$?

- A. $x = 0$ or $x = 6$
- B. $x = 6$ only
- C. $x = -6$ or $x = 0$
- D. $x = 3$ only

26. Which expression is the factorization of $x^2 + 7x + 12$?

- A. $(x + 3)(x + 4)$
- B. $(x + 2)(x + 6)$
- C. $(x - 3)(x - 4)$
- D. $(x + 1)(x + 12)$

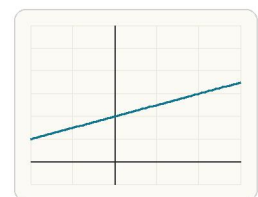
27. Which solution set solves $x^2 - 9x + 20 = 0$?

- A. $x = 4$ or $x = 5$
- B. $x = -4$ or $x = -5$
- C. $x = 10$ or $x = 2$
- D. $x = 9$ or $x = 20$

28. Factor $x^2 + 5x + 6$. Answer in factored form.

29. Solve $x^2 - 5x + 6 = 0$. Answer with all solution values of x .

30. Which relation is quadratic: $y = x + 4$, $y = x^2 + 4$, or $y = 2^x + 4$?



The quadratic relation makes the U-shaped graph.

- A. $y = x^2 + 4$
- B. $y = x + 4$
- C. $y = 2^x + 4$
- D. All three

31. Solve $x^2 - x - 6 = 0$.

- A. $x = -2$ or $x = 3$
- B. $x = 2$ or $x = -3$
- C. $x = -1$ or $x = 6$
- D. $x = 1$ or $x = -6$

32. A ball's height over time is modeled by $h = -16t^2 + 40t + 5$. What does the 5 represent?

- A. The time when the ball lands
- B. The slope of the path
- C. The initial height of the ball
- D. The maximum height