# Advanced Quadratics and Features

Vertex form, axis of symmetry, completing the square, and the quadratic formula.

Name _____ Date _____

32 main · 2-up grid · 2 pages

**Completion Reward**

Shown here as a small pack artifact, not a preview destination.

**1. What is the vertex of y = (x - 2)^2 + 5?**

A. (-2, 5)
B. (2, -5)
C. (-2, -5)
D. (2, 5)

**2. Which formula solves ax^2 + bx + c = 0?**

A. x = b^2 - 4ac
B. x = (-b +- sqrt(b^2 - 4ac)) / (2a)
C. x = -b / a
D. x = a^2 + b^2

**3. What line passes through the middle of a parabola?**

A. Axis of symmetry
B. y-intercept
C. secant line
D. directrix

**4. What is the vertex of y = (x + 3)^2 - 1?**

A. (3, -1)
B. (-3, 1)
C. (3, 1)
D. (-3, -1)

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

A. They forgot to square both sides again.
B. They should have written x = 0.
C. They forgot the negative solution x = -5.
D. Nothing is missing because 5 is the only solution.

**6. Solve x^2 = 49.**

A. x = -7 or x = 7
B. x = 7 only
C. x = -7 only
D. No real solution

**7. For x^2 + 4x + 10 = 0, what does the discriminant say?**

A. There are two different real solutions.
B. There is one repeated real solution.
C. There are no real solutions.
D. The equation must be linear.

**8. How many real solutions does x^2 + 4 = 0 have?**

A. One real solution
B. Two real solutions
C. No real solutions
D. Infinitely many real solutions

**9. What is the axis of symmetry of y = x^2 - 6x + 5?**

A. x = 3
B. x = -3
C. y = 3
D. x = 6

**10. For y = -2(x + 1)^2 + 3, what is the maximum value?**

A. -2
B. 3
C. 1
D. -3

**11. What is the vertex of y = (x - 2)^2 + 7?**

A. (-2, 7)
B. (2, 7)
C. (2, -7)
D. (7, 2)

**12. How does the graph of y = -2(x - 1)^2 + 4 open?**

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

**13. A parabola has x-intercepts at 1 and 5. What is its axis of symmetry?**

A. x = 3
B. x = 2
C. x = 4
D. x = 6

**14. What is the best first step to complete the square for x^2 + 8x + 3?**

A. Square 8 directly.
B. Multiply 8 and 3.
C. Set the expression equal to 0 first no matter what.
D. Take half of 8 and square it.

**15. What is the best next step to solve x^2 + 6x = 7 by completing the square?**

A. Add 6 to both sides.
B. Multiply both sides by 2.
C. Factor the left side as (x + 6)^2.
D. Add 9 to both sides.

**16. A student adds 4 to the left side of x^2 + 4x = 5 but not to the right side. What is the problem?**

A. Completing the square must keep the equation balanced by adding the same amount to both sides.
B. You should subtract 4 from the left side instead.
C. Quadratics should never be rewritten as perfect squares.
D. The student should have divided by 4 first.

**17. A student says the vertex of y = (x - 5)^2 + 2 is (-5, 2). What is the mistake?**

A. The y-value should always be negative.
B. In vertex form, x - 5 means h = 5, not -5.
C. The square should be distributed first.
D. The vertex is always on the y-axis.

**18. Solve x^2 - 5x + 6 = 0.**

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

**19. Which quadratic 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)

**20. Find the axis of symmetry of y = x^2 - 6x + 5. Answer with your final expression.**

**21. For y = x^2 - 6x + 5, what is the y-value of the vertex? Answer with a number.**

**22.** **Rewrite x^2 + 4x + 1 in vertex form. Answer as an equation.**

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

**24.** **Rewrite x^2 + 8x + 6 in completed-square form. Answer as an equation.**

**25.** **What is the maximum value of y = -3(x + 1)^2 + 5? Answer with a number.**

**26.** **Find the x-intercepts of y = (x - 4)(x + 1). Answer with your final expression.**

**27.** **After completing the square, which equation comes from x^2 + 4x = 5?**

A. (x + 4)^2 = 21
B. (x + 2)^2 = 9
C. (x + 2)^2 = 5
D. (x + 4)^2 = 9

**28.** **What is the most efficient method to solve x^2 - 16 = 0?**

A. Use the quadratic formula first.
B. Use square roots.
C. Graph it and guess.
D. There is no efficient method.

**29.** **What are the solutions of x^2 - 2x - 3 = 0?**

A. x = -1 or x = 3
B. x = 1 or x = -3
C. x = -1 only
D. x = 3 only

**30.** **Solve x^2 - 6x + 9 = 0. Answer in the form x = ...**

**31.** **Solve x^2 + 4x + 10 = 0. Answer in the form x = ...**

**32.** **Which method best reveals the vertex of y = x^2 - 4x + 1?**

A. Only factor it.
B. Only look at the y-intercept.
C. Rewrite in vertex form by completing the square.
D. Turn it into a linear equation first.