Quadratic Foundations

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

Name _____ Date _____

32 main | 2-up grid | 12 pages | visible side quests

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

1.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

1.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

1.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

1.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

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

2.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

2.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

2.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

2.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

3.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

3.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

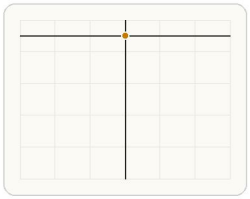
3.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

3.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

4.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

4.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

4.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

4.5. If (x - 5)(x + 2) = 0, one solution is:

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

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.

5.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

5.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

5.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

5.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

6.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

6.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

6.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

6.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

7.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

7.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

7.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

7.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

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

8.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

8.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

8.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

8.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

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

9.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

9.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

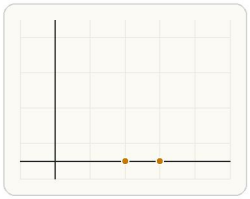
9.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

9.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

10.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

10.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

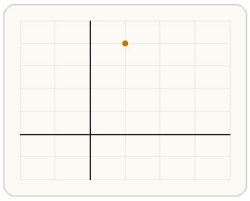
10.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

10.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

11.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

11.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

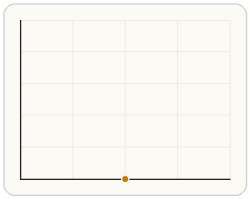
11.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

11.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

12.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

12.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

12.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

12.5. If (x - 5)(x + 2) = 0, one solution is:

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

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)

13.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

13.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

13.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

13.5. If (x - 5)(x + 2) = 0, one solution is:

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

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)

14.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

14.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

14.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

14.5. If (x - 5)(x + 2) = 0, one solution is:

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

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.

15.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

15.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

15.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

15.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

16.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

16.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

16.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

16.5. If (x - 5)(x + 2) = 0, one solution is:

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

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.

17.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

17.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

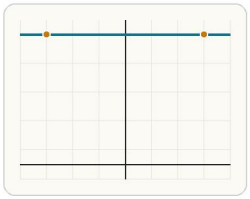
17.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

17.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

18.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

18.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

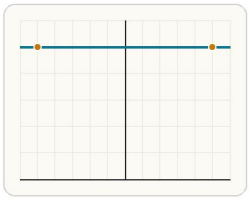
18.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

18.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

19.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

19.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

19.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

19.5. If (x - 5)(x + 2) = 0, one solution is:

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

20. Solve x^2 = 49.

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

20.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

20.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

20.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

20.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

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

21.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

21.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

21.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

21.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

22.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

22.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

22.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

22.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

23.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

23.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

23.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

23.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

24.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

24.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

24.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

24.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

25.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

25.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

25.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

25.5. If (x - 5)(x + 2) = 0, one solution is:

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

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)

26.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

26.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

26.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

26.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

27.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

27.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

27.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

27.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

28.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

28.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

28.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

28.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

29.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

29.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

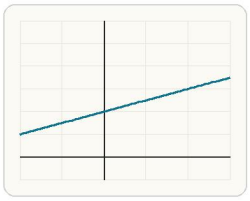
29.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

29.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

30.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

30.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

30.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

30.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

31.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

31.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

31.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

31.5. If (x - 5)(x + 2) = 0, one solution is:

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

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

32.1. If a quadratic has a positive leading coefficient, the parabola opens:

A. down
B. left
C. right
D. up

32.2. Which factorization matches x^2 + 5x + 6?

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

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

A. (4, 1)
B. (-4, 1)
C. (4, -1)
D. (1, 4)

32.4. What is the axis of symmetry of y = (x + 3)^2 - 2?

A. x = -3
B. x = 3
C. y = -2
D. y = 3

32.5. If (x - 5)(x + 2) = 0, one solution is:

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