Supercharged Math – Algebra 2 Readiness Test

Congratulations on completing Algebra 1 and Geometry!

Before your child moves on to the more advanced topics in Algebra 2, it's important to ensure they have a solid grasp of the concepts learned in Algebra 1 and Geometry.

> Algebra 1 provides the foundation for solving equations and working with exponents, while Geometry introduces crucial spatial reasoning and theorems related to shapes, angles, and proofs. These skills are essential for understanding the more complex material in Algebra 2, where topics like quadratic equations, functions, and systems of equations build upon both sets of principles.

Geometry and Algebra are both critical parts of the learning process that helps strengthen problem-solving skills and logical thinking. This test will help identify any gaps in your child's knowledge so that they are fully prepared for the challenges of Algebra 2.

Students who score 85% or higher are likely ready to begin Algebra 2.

Students who score below 85%: Review the missed topics before starting Algebra 2, and also consider a plan to get additional support during the course. You may use these resources to review the important topics: Algebra 1 and Geometry and Summer Workshops before starting Algebra 2.

Answer key is on the two last pages.

Factor the following polynomials using any method:

1. $x^2 + 7x + 10$
2. $x^2 - 3x - 10$
3. $x^2 - 8x + 15$

Solve the following by completing the square:

4. $x^2 + 6x + 5 = 0$
5. $x^2 + 10x + 21 = 0$

6. Simplify:

$$\frac{\sqrt{3} + \sqrt{75}}{5}$$

7. Solve:

$$\sqrt{5p - 7} - 6 = -4$$

Use the quadratic formula to solve for x:

8. $2x^2 - 3x - 5 = 0$
9. $x^2 + 4x + 1 = 0$

10. A fair six-sided die is rolled four times. What is the probability that a 5 will appear all four times?

11. Find the equation of the line that passes through (-2, 3) and is perpendicular to $y = ¼ x - 2$

12. The number of blue candies varies inversely as the square of the number of red candies. Initially, when there are 8 blue candies, there were 5 reds. How many blues would there be if there were 10 red?

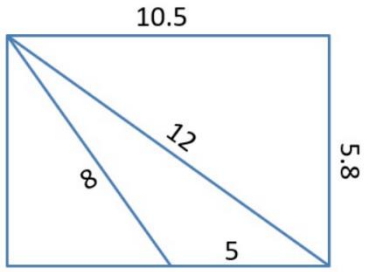
13. Graph the linear inequality:
$y < -\frac{3}{4}x + 2$

14. Solve the system of equations: $y - 14 = -3x$ and $5y = x + 6$

15. Simplify: $(3 + \sqrt{5})(\sqrt{5} - 2)$

16. Solve the equation: $\frac{3x}{4} - \frac{2x-1}{5} = 6$

17. What is the area of the obtuse triangle?



18. What is the diameter of a sphere measuring 260 billion cubic miles?

Factor by grouping:

19. $xy + 3x - 2y - 6$

20. $4ab - 8a + 6b - 12$

Simplify:

21. $(2\,x^3\,y^{-2})^2$

22. Given: $f(x) = 2x^2 - 3x + 4$

    Find:
    a. $f(-2)$
    b. $f(4)$
    c. $f(x+1)$

23. Factor: $2x^2 + 7x + 3$

24. A parabola has x-intercepts at -2 and 4 and a vertex at (1, -9).
    a. What are the zeros?
    b. What is the axis of symmetry?
    c. Is the vertex a maximum or a minimum?

25. Simplify: $(x^2 - 9) / (x^2 + 5x + 6)$

26. A rectangular garden is 5 feet longer than it is wide. The area is 84 square feet. Find the dimensions.

27. Find the domain: $f(x) = \frac{1}{(x-4)}$

28. Factor the following:
    a. $18x^3 + 24x^2$

    b. $x^2 - 5x - 24$

    c. $6x^2 + 11x + 3$

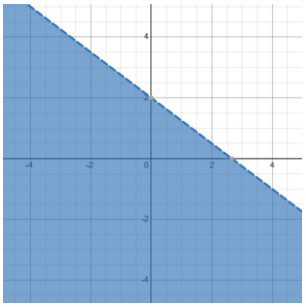
    d. $25x^2 - 16$

    e. $x^3 + 27$

    f. $27x^3 - 125$

    g. $x^3 + 2x^2 + 3x + 6$

Answers:

1. (x+2) (x+5)
2. (x-5) (x+2)
3. (x-3) (x-5)
4. x = -1, -5
5. x = -3, -7
6. $\frac{6\sqrt{3}}{5}$
7. $\frac{11}{5}$
8. x = 2.5, -1
9. $x = -2 \pm \sqrt{3}$
10. $\frac{1}{6^4} = \frac{1}{1296}$
11. y = -4x – 5
12. 2
13. 
14. x = 4, y = 2
15. $\sqrt{5} - 1$
16. 116/7 = 16.57
17. 14.5
18. About 7,915 miles, depending on rounding (acceptable answers: 7,900 – 7,920 miles)
19. (x – 2) (y + 3)
20. 2 (2a+ 3) (b – 2)

21. $\dfrac{4x^6}{y^4}$

22. f(x):

    a. 18

    b. 24

    c. $2x^2+x+3$

23. $(2x+1)(x+3)$

24. Parabola:

    a. $x = -2, 4$

    b. $x = 1$

    c. minimum

25. After factoring and cancelling: $\dfrac{x-3}{x+2}, \quad x \neq -3, -2$

26. Width = 7 feet, Length = 12 feet

27. Domain: All real numbers except x = 4 $(-\infty, 4) \cup (4, \infty)$

28. a. $18x^3 + 24x^2 = 6x^2(3x + 4)$
    Method: Greatest common factor

    b. $x^2 - 5x - 24 = (x - 8)(x + 3)$
    Method: Basic trinomial factoring

    c. $6x^2 + 11x + 3 = (3x + 1)(2x + 3)$
    Method: Trinomial factoring where $a \neq 1$

    d. $25x^2 - 16 = (5x - 4)(5x + 4)$
    Method: Difference of squares

    e. $x^3 + 27 = (x + 3)(x^2 - 3x + 9)$
    Method: Sum of cubes

    f. $27x^3 - 125 = (3x - 5)(9x^2 + 15x + 25)$
    Method: Difference of cubes

    g. $x^3 + 2x^2 + 3x + 6 = (x + 2)(x^2 + 3)$
    Method: Factoring by grouping