Before Algebra III Study Guide

🔆 Welcome to Algebra III! 🔆

Algebra III builds on foundational algebraic concepts and explores more advanced topics, including polynomial functions i, rational expressions +, exponential and logarithmic functions , and systems of equations . In addition, this course introduces trigonometric functions , delving into their properties, graphs, and applications, which form the foundation for understanding periodic behavior and real-world phenomena . These topics together lay the groundwork for higher-level mathematics and problem-solving in various fields, such as physics , engineering , and economics ?

Over the Summer, you should work this review packet to prepare for an Algebra III review assessment on Monday August 18th! Please work the problems on looseleaf and clearly identify the problem as you will not have enough room to work them on the packet. Work diligently on these review questions and be sure to ask any questions you might have when we return.

With love,

Ms. Mayers

Section I: Factoring Review

Part A: Factor Completely

- 1. x^2 + 5x + 6
- 2. x^2 9
- 3. 2x^2 + 7x + 3
- 4. x^2 16x + 64
- 5. 3x^2 12x
- 6. 4x^2 25

Part B: Factor by Grouping

- 1. x^3 + 3x^2 + 2x + 6
- 2. $2x^3 + 5x^2 + 4x + 10$

Part C: Special Factoring Patterns

- 1. x^2 36
- 2. x^2 + 6x + 9
- 3. x^3 + 8
- 4. 27x^3 1

Part D: Challenge Problems

- 1. x^4 81
- 2. x^3 6x^2 + 11x 6
- 3. x^2(4x^2 9)

Section II: Algebra III Preparation

Part 1: Polynomial Functions

Review how to work with polynomials-this will be a major focus in Algebra III.

- 1. Simplify the following expressions:
 - $(3x^3 + 2x^2 5x + 7) + (4x^3 3x^2 + 2x 5)$
 - $(5x^4 2x^3 + 4x^2) (x^4 + 3x^3 2x^2 + 8x)$
- 2. Multiply the following polynomials:
 - (x+3)(x-5)
 - $(2x^2 3x + 1)(x 4)$
- 3. Factor the following polynomials:
 - $x^2 + 5x + 6$
 - $2x^2 7x + 6$

Part 2: Rational Expressions

Understanding rational expressions will help you simplify and manipulate algebraic fractions in Algebra III.

1. Simplify the following rational expressions:

•
$$\frac{4x^2 + 8x}{2x}$$
•
$$\frac{6x^2 - 9x}{3x^2}$$

2. Find the domain of the following rational functions:

•
$$f(x) = \frac{1}{x-2}$$

• $g(x) = \frac{5x}{x^2-4}$

- 3. Solve the rational equation:
 - $\bullet \quad \frac{1}{x+2} = \frac{3}{x-1}$

Part 3: Exponents and Logarithms

These topics are essential for solving equations involving exponential growth or decay.

- 1. Simplify the following expressions using exponent rules:
 - $x^4 \cdot x^3$
 - $\frac{y^7}{y^3}$
 - $(2x^3)^2$
- 2. Solve the following logarithmic equations:
 - $\log_2(x) = 5$
 - $3\log(x) = 6$

Part 4: Trigonometry Basics

You'll begin working with trigonometric functions in Algebra III, so it's important to review the basics of sine, cosine, and tangent.

- 1. Evaluate the following trigonometric functions on the unit circle:
 - $\sin\left(\frac{\pi}{4}\right)$
 - $\cos\left(\frac{\pi}{6}\right)$
 - $\tan\left(\frac{\pi}{3}\right)$
- 2. Convert the following between degrees and radians:
 - 45° = _____ radians
 - $\frac{\pi}{3}$ radians = ____ degrees
- 3. Solve for x in the following trigonometric equation:
 - $\sin(x)=rac{\sqrt{2}}{2}$, where $0\leq x<2\pi$

Part 5: Systems of Equations

Systems of equations are useful for solving real-world problems and will continue to be a major tool in Algebra III.

- 1. Solve the following system of equations using substitution or elimination:
 - 2x + 3y = 12
 - x 4y = -1
- 2. Solve the following system of equations:
 - $x^2 + y^2 = 25$
 - y = 3x 5

📥 Reflection

Take a moment to reflect on your progress this summer!

- 1. Which topics did you find most challenging?
- 2. Which topics did you feel confident with?
- 3. What questions do you have about the material, and what would you like to focus on in Algebra III?