

Algebra Review Topics

- Exponent rules

$$(x^a)^b = x^{ab}$$

$$(xy)^a = x^a y^a$$

$$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$$

$$x^a \cdot x^b = x^{a+b}$$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$x^0 = 1$$

$$x^{-1} = \frac{1}{x}$$

$$x^{-n} = \frac{1}{x^n}$$

$$\frac{1}{x^{-n}} = x^n$$

$$x^{1/2} = \sqrt{x}$$

$$x^{1/n} = \sqrt[n]{x}$$

$$x^{m/n} = \sqrt[n]{x^m} \\ = (\sqrt[n]{x})^m$$

- Combining like terms

- Adding and subtracting polynomials

- * Be sure to distribute the “-” when subtracting!

- Multiplying polynomials

- * FOIL only works when multiplying two binomials

- * Must know how to multiply polynomials with more than two terms

- Dividing polynomials

- * Must know methods other than synthetic division

- Special products

- * Difference of squares: $x^2 - a^2 = (x + a)(x - a)$

- * Square of a sum: $(x + a)^2 = x^2 + 2ax + a^2$

- * Square of a difference: $(x - a)^2 = x^2 - 2ax + a^2$

- * Cube of a sum: $(x + a)^3 = x^3 + 3ax^2 + 3a^2x + a^3$

- * Cube of a difference: $(x - a)^3 = x^3 - 3ax^2 + 3a^2x + a^3$

- * Difference of cubes: $x^3 - a^3 = (x - a)(x^2 + ax + a^2)$

- * Sum of cubes: $x^3 + a^3 = (x + a)(x^2 - ax + a^2)$

- * ****Most importantly: You MUST know there is a difference between these!****

- Factoring

- * You must be able to factor all kinds of polynomials

- Adding and subtracting rational expressions

- Multiplying and dividing rational expressions

- Rationalizing
 - * The goal is for the denominator to have an integer exponent!
- Solving equations
 - * Polynomial equations
 - Factoring and using the **Zero Product Rule**
 - Quadratic formula
 - * Radical equations
 - * By substitution
 - * Rational equations
- Solving inequalities
 - * Must be able to solve *nonlinear inequalities* by using interval testing
- Solving absolute value equations and inequalities
- Graphing
 - * Finding equation of a line
 - * Graphing a straight line
 - * Graphing a parabola
 - Finding vertex, roots, and axis of symmetry