Summary Chapter 1: Prerequisites

Algebra and Trigonometry from OpenStax, a free and open online.

Section 1:

Terminology

- Absolute value
- Algebraic expression
- Order of operations

Be Able To

- Use inequality symbols
- Evaluate absolute value
- Simplify an algebraic expression
- Evaluate an algebraic expression
- Use order of operations
- **Apply the concepts**: Reference page 16 problems 53 - 59

Section 2:

Terminology

- Exponent

Be Able To

- Simplify expressions using Product Rule for Exponents: $a^m \cdot a^n = a^{m+n}$
- Simplify expressions using Power-to-a-Power Rule for Exponent: $(a^m)^n = a^{mn}$
- Simplify expressions using Product-to-a-Power Rule for Exponents: $(ab)^m = a^m b^m$
- Simplify expressions using Quotient Rule for Exponents: $\frac{a^m}{a^n} = a^{m-n}$
- Simplify expressions using Negative rule for Exponents: $a^{-n} = \frac{1}{a^n}$
- Simplify expressions using Integer Exponents Rule: $a^0 = 1$
- Simplify expression using Quotient-to-a-Power Rule for Exponents: $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$
- Convert from Scientific to Decimal Notation and vice versa (know calculator notation)
- **Apply the concepts**: Reference pages 29 -30 problems 44 - 50

Section 3:

Terminology

- Roots
- Radical
- Rationalize
- Rational exponents

Be Able To

- Evaluate n^{th} roots
- Use the Product Rule for Square Roots: $\sqrt[n]{ab} = \sqrt[n]{a} \bullet \sqrt[n]{b}$
- Use the Quotient Rule for Square Roots: $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$
- Add and subtracting radicals
- Rationalize denominators
- Evaluate and simplify rational exponents
- **Apply the concepts**: Reference page 40 problems 65-66

Section 4:

Terminology

- Polynomial
- Degree
- Leading coefficient

Be Able To

- Identify the degree and leading coefficient of polynomials
- Add and subtract polynomials
- Multiply binomials:
  sum and difference of the same two terms: $(a+b)(a-b) = a^2 - b^2$

squaring binomial: $(a+b)^2 = a^2+2ab+b^2$

$(a-b)^2 = a^2-2ab+b^2$

cubing binomial: $(a+b)^3 = a^3+3a^2b+3ab^2+b^3$

$(a-b)^3 = a^3-3a^2b+3ab^2-b^3$

- Multiply polynomials in two variables
- **Apply the concepts**: Reference page 48 problems 53 - 54

Section 5:

Terminology

- Factor
- Greatest common factor

Be Able To

- Factor out the greatest common factor of a polynomial
- Factor by grouping
- Factor trinomials
- Factor the difference of two squares: $a^2-b^2=(a+b)(a-b)$
- Factor perfect square trinomials: $a^2+2ab+b^2=(a+b)^2$

  $a^2-2ab+b^2=(a-b)^2$
- Factor the sum or difference of two cubes:

  $a^3+b^3=(a+b)(a^2-ab+b^2)$

  $a^3-b^3=(a-b)(a^2+ab+b^2)$
- Factoring algebraic expressions containing fractional and negative exponents
- **Apply the concepts**: Reference page 57 problems 51 -54

Section 6:

Terminology

- Rational expression
- Complex expression

Be Able To

- Find domain of rational expressions
- Simplify rational expressions
- Multiply rational expressions
- Divide rational expressions
- Add and subtracting rational expressions with the same denominator
- Add and subtracting rational expressions with different denominator
- Complex rational expressions
- Fractional expressions in Calculus
- Rationalize numerators
- **Apply the concepts**: Reference page 65 problems 51 - 33