

Algebra Review

Key Topics:

- The laws of exponents, Simplifying expressions involving exponents
- The properties of radicals, simplifying radicals, rationalization
- Polynomials, operations on polynomials, factoring, solving linear and quadratic equations
- Adding, subtracting, multiplying, dividing, and simplifying rational expressions, rationalizing binomial denominators.

Section R.4 Polynomials and Factoring

Key Topics:

- Know how to add, subtract, and multiply polynomials
- Know how to factor out greatest common factors.
- Know how to factor by grouping. Also know how to factor trinomials
- Memorize key factoring formulas: difference of squares, perfect squares, sums of cubes, and differences of cubes.
- Know how to combine more than one factoring method.

Section 2.3 Functions

Key Topics:

- Know the definition of a function. Be able to use the vertical line test to determine whether a given graph is the graph of a function.
- Be able to find the domain and range of a function either from its formula or from its graph.
- Be able to recognize intervals where a function is increasing, decreasing, or constant.
- Be able to interpret the graph of a function.
- Be able to find the sum, difference, product, quotient, and composition of two functions.

Section 2.4 and 2.5 Linear Functions and Linear Models

Key Topics:

- Understand how to find the slope of a line as well as its x and y -intercepts.
- Understand that the slope of a line is a rate of change.
- Be able to Finding the equation of a line given to points, or given a point and a slope.
- Be able to graph linear functions.
- Know and be able to apply the definition of parallel and perpendicular lines (in particular, know how to find their slopes).
- Be able to solve applications involving Cost, Revenue, and Profit functions.
- Be able to find linear supply and demand functions.
- Be able to find the break even point in a given financial situation.

Section 11.1 and 11.2 Limits and Continuity

Key Topics:

- Understand the definition of a limit.
- Be able to investigate the value of a limit using graphs and tables of values.
- Be able to Find the value of a limit both algebraically and based on a graph.
- Be able to Show that a limit does not exist.
- Be able to determine the value of an infinite limit.
- Know the properties of limits and be able to apply them in order to compute the value of a limit expression.
- Be able to solve application problems involving limits.
- Understand the definition of one sided limits, and be able to evaluate them.
- Memorize the definition of continuity. Be able to identify where the graph of a function is discontinuous.
- Understand how to draw the graph of a piecewise defined function and be able to determine whether or nor a piecewise defined function is continuous.

Section 11.3 and 11.4 Rates of Change and the Derivative

Key Topics:

- Be able to find the average rate of change of a function over a given interval (finding the slope of a secant line).
- Understand that the derivative is an instantaneous rate of change (the slope of a tangent line).
- Memorize the formal limit definition of the derivative $f'(x)$ and be able to use it to compute the derivative of a function and to compute the slope of the tangent line to a function at a given point.
- Be able to find the equation of the tangent line to a function at a given point.
- Be able to solve application problems involving tangent and secant lines.

Section 12.1-12.3 Differentiation Formulas

Key Topics:

- Be able to find the derivative of constant functions, linear functions, and power functions.
- Be able to find the derivative of a constant multiple of a function or the sum or difference of a pair of functions.
- Be able to find the derivative of products and quotients of functions.
- Be able to decompose a composite function into two component functions.
- Be able to use the Chain Rule to find the derivative of a composite function.
- Be able to combine multiple differentiation methods to find the derivative of a function.
- Be able to solve application problems involving the derivative.