## **Functions**

- Continuity
- Extrema, intervals of increase and decrease
- Power functions
- Average rates of change
- Transformations of graphs
- Piecewise functions
- Operations
- Inverses

# Power, Polynomial, and Rational Functions

- Graphs, real zeros, and end behavior
- Dividing polynomial functions
- The Remainder Theorem and bounds of real zeros
- Writing polynomial functions and conjugate roots
- Complex zeros & Fundamental Theorem of Algebra
- Graphs of rational functions
- Rational equations
- Polynomial inequalities
- Rational inequalities

# **Exponential and Logarithmic Expressions**

- Graphing exponential functions
- Exponential equations not requiring logarithms
- Exponents and logarithms
- Evaluating logarithms
- Logarithms and exponents as inverses
- Properties of logarithms
- Writing logs in terms of others
- Exponential equations requiring logarithms
- Logarithmic equations, simple
- Logarithmic equations, hard
- Graphing logarithmic functions

Compound interest

## Trigonometry

- Angles and angle measure
- Right triangle trigonometry
- Trig functions of any angle
- Graphing trig functions
- Simple trig equations
- Inverse trig functions
- Fundamental identities
- Equations with factoring and fundamental identities
- Sum and Difference Identities
- Multiple-Angle Identities
- Product-to-Sum Identities
- Equations and Multiple-Angle Identities
- The Law of Sines
- The Law of Cosines

# **Parametric Equations**

- Parametric equations
- Projectile motion

#### **Polar Coordinates**

- Polar coordinates
- Graphs of polar equations
- Polar and rectangular forms of equations
- Polar forms of conic section
- Complex numbers and polar form

#### Vectors

- Vector basics
- Vector operations
- Dot products

#### **Three-Dimensional Vectors**

- 3D vector basics
- 3D vector operations
- Vector cross products

## **Matrices and Systems**

- Matrix operations
- Matrix inverses and determinants
- Matrix equations
- Cramer's Rule
- Multivariable linear systems and row operations
- Partial fraction decomposition

## **Conic Sections**

- Parabolas
- Circles
- Ellipses
- Hyperbolas
- Rotations of conic sections

### **Discrete Mathematics**

- Sample spaces & Fundamental Counting Principle
- Permutations
- Combinations
- Permutations vs combinations
- The Binomial Theorem
- Mathematical induction

# **Probability**

- Independent and dependent events
- Mutually exclusive events
- Probability with combinatorics

Probability with combinatorics - binomial

# **Sequences and Series**

- General sequences and series
- Arithmetic sequences and series
- Geometric sequences and series
- Power series

## Introduction to Calculus

- Limits by direct evaluation
- Limits at kinks and jumps
- <u>Limits at removable discontinuities</u>
- Limits at essential discontinuities
- Limits at infinity
- Definition of the derivative
- Instantaneous rates of change
- Power rule for differentiation
- Motion along a line
- Approximating area under a curve
- Area under a curve by limit of sums
- Indefinite integrals