
## Precalculus: Virginia Tech

(For a list of materials used in the course, please see http://www.theNCAT.org/R2R/AcadPrac/CM/VT_PreCalc_Mat.pdf.)

Precalculus is a one-semester, three-credit course covering the following topics:

Basics
- Real Numbers
- Coordinate Line
- Coordinate Plane
- Positive Integer Exponents
- Rational Exponents

Simplifying Algebraic Equations
- Multiplying polynomial expressions
- Factoring simple polynomial expressions
- Factoring quadratic expressions
- Simplifying rational expressions
- Addition/subtraction with rational expressions
- Applications with algebraic expressions

Equations
- Solving equations
- Solving linear equations
- Solving quadratic equations with factoring
- Solving quadratic equations with the quadratic formula
- Solving equations using higher order factoring
- Direct/Inverse proportion
- Solving linear inequalities
- Solving literal equations

Functions
- Understanding functions
- Notation and input-output
- Definitions
- Graphing functions
- Average rate of change
- Linear functions
- Forms for equations to describe a line
- Polynomial/rational functions
- Piecewise-defined functions
- Absolute value
- Arithmetic combinations of functions
- Composite functions
- Inverse functions
- Applications of functions

Graphing
- Graphing Lines
- Graphing Polynomial Functions
- Graphing Rational Functions – Part 1
- Graphing Rational Functions – Part 2
- Using Graphs to Create New Graphs
- Graphing Parabolas
- Graphing Circles
- Graphing Ellipses
- Graphing Hyperbolas
- Interpreting Graphs

Exponential and Logarithmic Functions
- Radicals and Rational Exponents
- Behavior of Exponential Functions
- Rates of Change of Exponential vs. Linear
- Solve equations using exponential properties
- Logarithms and Their Properties
- Applications of Exponential Functions
- Curve Fitting for Exponential Growth and Decay

Trigonometry
- Periodic functions
- Angles in degrees
- Angles in radians
- Sine and cosine functions
- Tangent, cotangent, secant, and cosecant functions
- Common angles
- Right triangle trigonometry
- Basic trigonometric identities
- Combining trigonometric functions with algebraic function