GRADE 12 Pre-Calculus Syllabus

Pre-calculus is a course designed to prepare students for topics covered in an elementary Calculus course at the college level. It begins with a comprehensive study of functions and moves into an analysis of rudimentary calculus concepts. In addition to introducing students to terminology and concepts essential to the study of Calculus, this course should also help students develop reasoning and analytical skills which may be applied to problems outside the typical realm of mathematics.

An additional goal of this course is to introduce students to the graphing calculator and its wide range of useful functionality. The TI 84 Plus is a recommended calculator.

Functions

1. Domain and range
2. Distinguish between relations and functions
3. Evaluate functions
4. Composite function
5. Inverse of a function
6. Complete tables for linear function graphs
7. Find the slope of a linear function
8. Graph linear functions
9. Equation of linear functions written in slope intercept form
10. Equation of linear functions written in point slope form

Family of Functions

1. Linear Function
2. Quadratic Function
3. Cubic Function
4. Absolute Value Function
5. Polynomial Function
6. Rational Function
7. Square Root Function
8. Exponential Function
9. Trigonometric functions
10. Logarithmic Function

Quadratic Functions

1. Use the discriminate to find the number of solutions to a quadratic equation.
2. Determine the x coordinate for the vertex of a quadratic function;
3. Determine the equation for the line of symmetry for a quadratic function
4. Find the maximum or minimum value of a quadratic function
5. Characteristics of quadratic functions
6. Graph a quadratic function
7. Solve a quadratic equation by factoring
8. Solve a quadratic equation by completing the square
9. Solve a quadratic equation using the quadratic formula
10. Tangent to a curve
11. Finding the gradient at a point
12. Equation for a tangent line
13. Equation for the normal

Polynomial

Divide polynomials using long division

Factor differences between two squares

Factor differences between two cubes

Rational Functions

Finding domain and range

Finding vertical asymptote

Graph rational functions

Exponential and Logarithmic Functions

Convert between exponential and logarithmic form

Solve exponential equations

Evaluate logarithms

Properties of logarithms

Roots of a Fraction

Find the roots of fractions

Rationalization

Rationalizing the denominator

Using the conjugate

Imaginary Numbers and Complex Numbers

Powers of *i*

Add, subtract, multiply and divide imaginary numbers

Add, subtract, multiply and divide complex numbers

Trigonometry

1. Convert between radians and degrees
2. Radians and arc length
3. Identifying quadrants
4. Coterminal and reference angles
5. Trigonometric ratios using right triangles
6. Trigonometric ratios using the unit circle
7. Find trigonometric ratios using reference angles
8. Inverses of trigonometric functions
9. Solve trigonometric equations
10. Use trigonometric ratios to find the length of a side
11. Use trigonometric ratios to find an angle measure
12. Using sine rule
13. Using rule
14. Area of a triangle using sine formula
15. Area of a triangle using Heron's formula

Introduction to Limits

Evaluating limits

Limit to infinity