Pre-Calculus Syllabus (Second Semester)

Unit 10: Rational functions

Lesson 01: Rational parent function, proper rational form

Lesson 02: Discontinuities, holes, vertical asymptotes

Lesson 03: End behavior, horizontal and slant asymptotes

Lesson 04: Graphing simple rational functions

Lesson 05: Graphing rational functions with slant asymptotes

Lesson 06: Using a graph to write a rational function

Cumulative review, unit 10
Unit 10 review
Test: Unit 10 test

Unit 11: Exponent rules, power functions, exponential functions

Lesson 01: Exponential rules (with integer exponents)

Lesson 02: Using rational exponents

Lesson 03: Power functions of the form $x^{1/n}$; definition of *e*

Lesson 04: Exponential parent functions, transformations

Lesson 05: Solving exponential equations

Lesson 06: Applications of exponential functions

Cumulative review, unit 11
Unit 11 review
Test: Unit 11 test

Unit 12: Graphing trig functions

Lesson 01: Sine, cosine, & tangent parent functions, simple transformations of the form *(a)sin(x)+ k*

Lesson 02: Graphing trig functions of the form *(a)sin(bx + c) + k*

Lesson 03: Graphing secant, cosecant, and cotangent

Test: Unit 12 test

Unit 13: Inverse functions

Lesson 01: Inverse function fundamentals, graphical & algebraic

Lesson 02: Restricting domains so as to produce inverse functions

Lesson 03: Algebraic verification of inverses

Lesson 04: Inverse trig functions and graphs

Cumulative review, unit 13
Unit 13 review
Test: Unit 13 test

Unit 14: Logarithm functions

Lesson 01: Log parent function, transformations

Lesson 02: Log fundamentals, common & natural logs

Lesson 03: Log theorems

Lesson 04: Solving equations using logs

Lesson 05: Applications of log & exponential equations

Cumulative review, unit 14
Unit 14 review
Unit 14 test

Unit 15: Sequences & series

Lesson 01: Sequence fundamentals, arithmetic & geometric sequence fundamentals

Lesson 02: Arithmetic sequences in depth

Lesson 03: Geometric sequences in depth

Lesson 04: Arithmetic series (sigma notation)

Lesson 05: Finite geometric series

Lesson 06: Infinite geometric series

Cumulative review, unit 15
Unit 15 review
Unit 15 test

Unit 16: Parametric equations

Lesson 1: Definitions and fundamentals

Lesson 2: Parameter restrictions, domain and range issues

Lesson 3: Parametric form of ellipse & circle, writing parametric equations

Lesson 4: Parametric motion problems

Cumulative review, unit 16
Unit 16 review
Unit 16 test

Unit 17: Polar coordinates

Lesson 1: Polar coordinate fundamentals (rectangular-polar conversions)

Lesson 2: Graphs of simple polar equations

Lesson 3: More polar graphs (cardiods & limacons)

Lesson 4: Rectangular-polar function conversions

Cumulative review, unit 17
Unit 17 review
Unit 17 test

Unit 18: Binomial expansion

Lesson 1: Binomial expansions basics, Pascal's triangle

Lesson 2: Binomial expansion with summation notation & combinations
Unit 18 test

Unit 19: Vectors

Lesson 1: Definitions and vector fundamentals

Lesson 2: Scalar product of vectors (dot product)

Lesson 3: Vector product (cross product)

Lesson 4: Applications of vectors

Unit 19 review
Unit 19 test

Semester summary

Semester review
Semester test

Enrichment Topics

Topic A: Analysis of absolute value inequalities

Topic B: Linear Programming

Topic C: Point-slope and intercept forms of a line

Topic D: The summation operator, Σ

Topic E: An unusual look at probability

Topic F: Rotations

Topic G: Absolute value parent functions

Topic H: Dimension changes affecting perimeter, area, and volume

Topic J: Algebraic solution to quadratic systems of equations.

Topic K: Derivation of the sine law

Topic L: Derivation of the cosine law

Topic M: Tangent composite function derivations

Topic N: Locating the vertex of a standard-form parabola

Topic O: Algebraic manipulation of inverse trig functions

Topic P: Logarithm theorem derivations

Topic Q: Arithmetic and geometric sum formulas