Pre Calculus TEKS (First Semester)

Unit 1: Algebra review

Lesson 01: Review: multiplying and factoring polynomials **A.2(A)**

Lesson 02: Review: rational expressions, complex fractions **2A.2(A),2A.10(C, F)**

Lesson 03: Review: solving equations **2A.2, A.3(A), 2A,2(A)**

Lesson 04: Review: equations of linear functions (lines) **A.6(D)**
Linear regression review **PC3(C)**

Lesson 05: Review: solutions of linear systems **2A.3(A), 2A.3(B), 2A.3(C)**

Unit 1 review
Test: Unit 1 test

Unit 2: Basic trigonometry

Lesson 01: Angle conventions; definitions of the six trig functions **PC1**

Lesson 02: Angle units; degrees(minutes & seconds), radians **PC1**

Lesson 03: Given one trig ratio, find the others **PC1**

Lesson 04: Special angles (0^o, 30^o, 60^o, 45^o, 90^o, 180^o, 270^o, 360^o) **PC1**

Lesson 05: Evaluating trig function on the graphing calculator **PC1, PC2(C)**

Unit 2 review
Test: Unit 2 test

Unit 3: Triangle solutions

Lesson 01: Abstract solutions of right triangles **PC1, PC2(A)**

Lesson 02: Right triangle word problems, triangle area **PC1, PC(A), PC3(D)**

Lesson 03: Vectors **PC6(A, B)**

Lesson 04: Sine law, more triangle area formulas **PC3(C)**

Lesson 05: Ambiguous case of the sine law **PC3(C)**

Lesson 06: Cosine law **PC3(C)**

Cumulative review, unit 3
Unit 3 review
Test: Unit 3 test

Unit 4: Trig identities

Lesson 01: Reciprocal and Pythagorean identities, trig simplifications **PC2(C)**

Lesson 02: Trig proofs **PC2(C)**

Lesson 03: Cosine composite angle identities **PC2(C)**

Lesson 04: Sine composite angle identities **PC2(C)**

Lesson 05: Tangent composite angle identities **PC2(C)**

Lesson 06: Product and factor identities **PC2(C)**

Cumulative review, unit 4
Unit 4 review
Unit 4 test

Unit 5: Solving trig equations

Lesson 01: Simple trig equations **PC2(C)**

Lesson 02: Advanced trig equations **PC2(C)**

Unit 5 test

Unit 6: Function fundamentals

Lesson 1: Basic definitions **PC1, PC(1(B)**

Lesson 2: More on domain, intercepts, notation, function values **PC1, PC1(B)**

Lesson 3: Function operations (composite functions) **PC2(B)**

Lesson 4: Reflections **PC2(A)**

Lesson 5: Even and odd functions **PC1(C)**

Lesson 6: Transformations of functions **PC2(A), PC2(B)**

Lesson 7: Minimum and maximum **PC1(D)**

Cumulative review, unit 6 **PC3(B)**
Unit 6 review
Unit 6 test

Unit 7: Quadratic functions (parabolas)

Lesson 1: Transformations of quadratic functions **PC1(B), PC2(A), PC2(C), PC2(B)**

Lesson 2: Three forms of quadratic functions **PC1, PC1(A)**

Lesson 3: Quadratic calculator applications **PC1, PC1(D)**

Lesson 4: Quadratic area applications **PC1, PC3**

Cumulative review, unit 7
Unit 7 review
Unit 7 test

Unit 8: Special functions

Lesson 1: Square root and semicircle functions **PC1, PC2(A)**

Lesson 2: Absolute value functions (|f(x)| and f(|x)) reflections) **PC1, PC2(A)**

Lesson 3: Piecewise functions **PC1, PC2**

Lesson 4: Greatest integer function **PC1, PC2**

Lesson 5: Power functions, 1/x **PC1(A), PC2(A)**

Cumulative review, unit 8 **PC3(B)**
Unit 8 review
Unit 8 test

Unit 9: Polynomial functions

Lesson 1: Creating polynomial functions **PC1(B, D)**

Lesson 2: Long division **PC1**

Lesson 3: Analyzing polynomials **PC1(B, C, D)**

Lesson 4: Polynomial applications **PC3(A, C, D)**

Cumulative review, unit 9

Unit 9 review

Unit 9 test

Semester summary

Semester review

Semester test

Alg II Enrichment Topics

Topic A: Analysis of absolute value inequalities **A.7(A), A.7(B), 2A.4(A)**

Topic B: Linear Programming **2A.3(A), 2A.3(B), 2A.3(C)**

Topic C: Point-slope and intercept forms of a line **A.6(D)**

Topic D: The summation operator, Σ **PC.4(A), PC.4(B)**

Topic E: An unusual look at probability **8.11(B)**

Topic J: Algebraic solution to quadratic systems of equations.

Topic K: Derivation of the sine law **PC3(D)**

Topic L: Derivation of the cosine law **PC3(D)**

Topic M: Tangent composite function derivations **PC3(D)**

Topic N: Locating the vertex of a standard-form parabola **PC1(D)**

Topic O: Algebraic manipulation of inverse trig functions **PC2(B)**

Topic P: Logarithm theorem derivations **PC1(A), 2(A)**

Topic Q: Arithmetic and geometric sum formulas **PC4(A-D)**

Topic R: Converting general form conics to standard form **PC5(A-B)**

Topic S: Conic section applications **PC5(A-B)**

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§111.35. Precalculus (One-Half to One Credit).

(a) General requirements. The provisions of this section shall be implemented beginning September 1, 1998, and at that time shall supersede §75.63(bb) of this title

(relating to Mathematics). Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisites: Algebra II, Geometry.

(b) Introduction.

(1) In Precalculus, students continue to build on the K-8, Algebra I, Algebra II, and Geometry foundations as they expand their understanding through other mathematical experiences. Students use symbolic reasoning and analytical methods to represent mathematical situations, to express generalizations, and to study mathematical concepts and the relationships among them. Students use functions, equations, and limits as useful tools for expressing generalizations and as means for analyzing and understanding a broad variety of mathematical relationships. Students also use functions as well as symbolic reasoning to represent and connect ideas in geometry, probability, statistics, trigonometry, and calculus and to model physical situations. Students use a variety of representations (concrete, numerical, algorithmic, graphical), tools, and technology to model functions and equations and solve real-life problems.

(2) As students do mathematics, they continually use problem-solving, language and communication, connections within and outside mathematics, and reasoning. Students also use multiple representations, applications and modeling, justification and proof, and computation in problem-solving contexts.

(c) Knowledge and skills.

(1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, radical, exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:

(A) describe parent functions symbolically and graphically, including $y = x^n$, $y = \ln x$, $y = \log_a x$, $y = 1/x$, $y = e^x$, $y = a^x$, $y = \sin x$, etc.;

(B) determine the domain and range of functions using graphs, tables, and symbols;

(C) describe symmetry of graphs of even and odd functions;

(D) recognize and use connections among significant points of a function (roots, maximum points, and minimum points), the graph of a function, and the symbolic representation of a function; and

(E) investigate continuity, end behavior, vertical and horizontal asymptotes, and limits and connect these characteristics to the graph of a function.

(2) The student interprets the meaning of the symbolic representations of functions and operations on functions within a context. The student is expected to:

(A) apply basic transformations, including $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(b \cdot x)$, $|f(x)|$, $f(|x|)$, to the parent functions;

(B) perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically; and

(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.

(3) The student uses functions and their properties to model and solve real-life problems. The student is expected to:

(A) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;

(B) use regression to determine a function to model real-life data;

(C) use properties of functions to analyze and solve problems and make predictions; and

(D) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas.

(4) The student uses sequences and series to represent, analyze, and solve real-life problems. The student is expected to:

(A) represent patterns using arithmetic and geometric sequences and series;

(B) use arithmetic, geometric, and other sequences and series to solve real-life problems;

(C) describe limits of sequences and apply their properties to investigate convergent and divergent series; and

(D) apply sequences and series to solve problems including sums and binomial expansion.

(5) The student uses conic sections, their properties, and parametric representations to model physical situations. The student is expected to:

(A) use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets;

(B) use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound;

(C) convert between parametric and rectangular forms of functions and equations to graph them; and

(D) use parametric functions to simulate problems involving motion.

(6) The student uses vectors to model physical situations. The student is expected to:

(A) use the concept of vectors to model situations defined by magnitude and direction; and

(B) analyze and solve vector problems generated by real-life situations.