Texas State Core Curriculum

Contents Standards, 2006

Precalculus	Boardworks Precalculus and Trigonometry presentations
(1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:	
(A) describe parent functions symbolically and graphically, including f(x) = xn, f(x) = 1n x, f(x) = loga x, f(x) = 1/x, f(x) = ex, f(x) = |x|, f(x) = ax, f(x) = sin x, f(x) = arcsin x, etc.;	The sine, cosine and tangent of any angle Trigonometric graphs and exact values The reciprocal trigonometric functions The inverse trigonometric functions Graphing rational functions Graphs of important non-linear functions Graphs of quadratic functions Exponential growth and decay Transforming trigonometric functions Exponentials and logarithms Exponentials with bases other than e Plotting and sketching graphs The laws of logarithms Absolute value functions Linear graphs
(B) determine the domain and range of functions using graphs, tables, and symbols;	Domain, range and composite functions Inverse functions Trigonometric graphs and exact values The inverse trigonometric functions The reciprocal trigonometric functions Exponentials with bases other than e
(C) describe symmetry of graphs of even and odd functions;	Even, odd and periodic functions

(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function; and	Plotting and sketching graphs Graphs of quadratic functions Using graphing calculators in applications Polynomials of degree 3 or more Graphs of important non-linear functions Graphing rational functions
(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.	Plotting and sketching graphs Graphs of quadratic functions Using graphing calculators in applications Polynomials of degree 3 or more Graphs of important non-linear functions Graphing rational functions Exponentials and logarithms Limits Piecewise-defined functions
(2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:	
(A) apply basic transformations, including a • f(x), f(x) + d, f(x - c), f(b • x), and compositions with absolute value functions, including |f(x)|, and f(|x|), to the parent functions;	Transforming functions part 1 Transforming functions part 2 Transforming trigonometric functions Absolute value functions The laws of logarithms Exponentials and logarithms Graphs of important non-linear functions
(B) perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically; and	Domain, range and composite functions Inverse functions The inverse trigonometric functions

(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.	The sine, cosine and tangent of any angle Trigonometric identities The law of sines and the area of a triangle The law of cosines Trigonometric identities using reciprocal functions The addition formulas The double angle formulas Expressions of the form a cos x + b sin x Questions on trigonometry The laws of logarithms Exponentials and logarithms Exponential growth and decay Exponentials with bases other than e Linear and exponential modeling
(3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:	
(A) investigate properties of trigonometric and polynomial functions;	The sine, cosine and tangent of any angle Trigonometric graphs and exact values The inverse trigonometric functions The reciprocal trigonometric functions Transforming trigonometric functions Graphs of quadratic functions Polynomials of degree 3 or more Even odd and periodic functions Operations with polynomials Dividing polynomials The Factor Theorem Graphs of important non-linear functions Solving quadratic equations

(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;	Exponential growth and decay Exponentials with bases other than e Linear and exponential modeling Transforming trigonometric functions The inverse trigonometric functions Solving quadratic equations Graphs of quadratic functions The sine, cosine and tangent of any angle Using graphing calculatros in applications
(C) use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient);	Using graphing calculators in applications
(D) use properties of functions to analyze and solve problems and make predictions; and	Using graphing calculators in applications Graphs of quadratic functions Transforming trigonometric functions Linear and exponential modeling Exponentials with bases other than e Exponential growth and decay The inverse trigonometric functions Solving quadratic functions

(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.	The sine, cosine and tangent of any angle Trigonometric graphs and exact values Trigonometric equations Trigonometric identities The law of sines and the area of a triangle The law of cosines Degrees and radians Solving equations using radians The inverse trigonometric functions The reciprocal trigonometric functions Trigonometric identities using reciprocal functions The addition formulas The double angle formulas Expressions of the form a cos x + b sin x 3–D trigonometry Transforming trigonometric functions Questions on trigonometry
(4) The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. The student is expected to:	
(A) represent patterns using arithmetic and geometric sequences and series;	Sequences Arithmetic sequences Geometric sequences The sum of an arithmetic series The sum of a geometric series Linear and exponential modeling Using graphing calculators in applications
(B) use arithmetic, geometric, and other sequences and series to solve real-life problems;	Sequences Arithmetic sequences Geometric sequences Other types of sequences Quadratic sequences part 1 Quadratic sequences part 2 Linear and exponential modeling Using graphing calculators in applications

(C) describe limits of sequences and apply their properties to investigate convergent and divergent series; and	The sum of a geometric series
(D) apply sequences and series to solve problems including sums and binomial expansion.	Sequences Arithmetic sequences Geometric sequences The sum of an arithmetic series The sum of a geometric series
(5) The student uses conic sections, their properties, and parametric representations, as well as tools and technology, 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;	Conic sections part 1 Conic sections part 2 Parametric equations of curves
(B) use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound;	Conic sections part 1 Conic sections part 2
(C) convert between parametric and rectangular forms of functions and equations to graph them; and	Parametric functions Parametric equations of curves
(D) use parametric functions to simulate problems involving motion.	Parametric equations of curves Questions on vectors
(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	Vectors in two and three dimensions The magnitude of a vector Adding and subtracting vectors Position vectors and coordinate geometry Vector arithmetic Using vectors The dot product The vector equation of a line Intersecting lines The intersection of a line and a plane Questions on vectors

(B) analyze and solve vector problems generated by real-life situations.	Vectors in two and three dimensions The magnitude of a vector Position vectors and coordinate geometry Vector arithmetic Using vectors Intersecting lines Questions on vectors