Texas Mathematics

Precalculus

Mathematical process standards	**B.** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution PC1.B
	PC1. The student uses mathematical processes to acquire and demonstrate mathematical understanding PC1
	A. apply mathematics to problems arising in everyday life, society, and the workplace PC1.A
	D. communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate PC1.D
	E. create and use representations to organize, record, and communicate mathematical ideas PC1.E
	C. select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems PC1.C
	F. analyze mathematical relationships to connect and communicate mathematical ideas PC1.F
	G. display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication PC1.G
Functions PC2	**P2.** P2
	A PC2.A
	B demonstrate that function composition is not always commutative PC2.B
	C represent a given function as a composite function of two or more functions PC2.C
	D describe symmetry of graphs of even and odd functions PC2.D
	F determine an inverse function, when it exists, for a given function over its domain or a subset of its domain and represent the inverse using multiple representations PC2.E

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	F	**graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions** PC2.F
	G	**graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems** PC2.G
	H	**graph arcsin x and arccos x and describe the limitations on the domain** PC2.H
	I	**determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing** PC2.I
	J	**analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems** PC2.J
	K	**analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes** PC2.K
	L	**determine various types of discontinuities in the interval (-∞, ∞) as they relate to functions and explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities** PC2.L
	M	**describe the left-sided behavior and the right-sided behavior of the graph of a function around discontinuities** PC2.M
	N	**analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems** PC2.N
	O	**develop and use a sinusoidal function that models a situation in mathematical and real-world problems** PC2.O
	P	**determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems** PC2.P
Relations and geometric reasoning	**PC3.**	**The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations** PC3
	A	**graph a set of parametric equations** PC3.A
	B	**convert parametric equations into rectangular relations and convert rectangular elations into parametric equations** PC3.B

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C use parametric equations to model and solve mathematical and real-world problems PC3.C

D graph points in the polar coordinate system and convert between rectangular coordinates and polar coordinates PC3.D

E graph polar equations by plotting points and using technology PC3.E

F determine the conic section formed when a plane intersects a double-napped cone PC3.F

G make connections between the locus definition of conic sections and their equations in rectangular coordinates PC3.G

H use the characteristics of an ellipse to write the equation of an ellipse with center (h, k) PC3.H

I use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k) PC3.I

Number and measure

PC4. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems PC4

A determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems PC4.A

B describe the relationship between degree and radian measure on the unit circle PC4.B

C represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position PC4.C

D represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity PC4.D

F use trigonometry in mathematical and real-world problems, including directional bearing PC4.F

E determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems PC4.E

H use the Law of Cosines in mathematical and real-world problems PC4.H

G use the Law of Sines in mathematical and real-world problems PC4.G

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se vectors to model situations involving magnitude and direction PC4.I

J represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically PC4.J

K apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems PC4.K

Algebraic reasoning

PC5. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms PC5

A evaluate finite sums and geometric series, when possible, written in sigma notation PC5.A

B represent arithmetic sequences and geometric sequences using recursive formulas PC5.B

C calculate the nth term and the nth partial sum of an arithmetic series in mathematical and real-world problems PC5.C

D represent arithmetic series and geometric series using sigma notation PC5.D

E calculate the nth term of a geometric series, the nth partial sum of a geometric series, and sum of an infinite geometric series when it exists PC5.E

F apply the Binomial Theorem for the expansion of (a + b)n in powers of a and b for a positive integer n, where a and b are any numbers PC5.F

G use the properties of logarithms to evaluate or transform logarithmic expressions PC5.G

H generate and solve logarithmic equations in mathematical and real-world problems PC5.H

I generate and solve exponential equations in mathematical and real-world problems PC5.I

J solve polynomial equations with real coefficients by applying a variety of techniques in mathematical and real-world problems PC5.J

K solve polynomial inequalities with real coefficients by applying a variety of techniques and write the solution set of the polynomial inequality in interval notation in mathematical and real-world problems PC5.K

L solve rational inequalities with real coefficients by applying a variety of techniques and write the solution set of the rational inequality in interval notation in mathematical and real-world problems PC5.L

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M use trigonometric identities such as reciprocal, quotient, Pythagorean, cofunctions, even/odd, and sum and difference identities for cosine and sine to simplify trigonometric expressions PC5.M

N generate and solve trigonometric equations in mathematical and real-world problems PC5.N