Precalculus
PISD Curriculum: Year at a Glance

Bundle	*Title*	
	Big Ideas/Enduring Understandings	Guiding Questions
1	***Polynomial, Linear, and Square Root Functions***	
	• All functions have a parent. • Even and odd functions involve symmetry. • Functions can be represented by graphs, tables and symbols. • Transformations involve vertical and horizontal shifting, stretching and compression. • The number of roots of a polynomial function is related to its degree. • Some functions require restrictions on their domain.	1. What is a function? 2. What methods can be used to find the domain and range of functions? 3. What conclusion can be drawn from a function or equation? 4. How can models of a function be used to make predictions in a real world situation? 5. How is the number of roots related to the degree of a polynomial function?
2	***Rational Functions***	
	• A function can be continuous at some points and not at others. A function is generally said to be discontinuous if there is any point of discontinuity. • When determining domain and range of a rational function, restrictions (causing such things as vertical asymptotes and holes) may need to be considered. • Patterns in end behavior of rational functions can be used to quickly sketch graphs of functions or to quickly identify characteristics of rational functions from graphs. • Rational functions may have a limit and may not	1. Why is the domain and/ or range of a rational function restricted? 2. What are the characteristics of a continuous function? 3. What determines end behavior? 4. What is the purpose of (RA)²TEY?
3	***Exponential and Logarithmic Functions***	
	• Exponential and logarithmic functions are inverses. • Exponential and logarithmic functions exhibit asymptotic behavior. • Properties of exponents and logarithms are related and can be used to simplify expressions and solve equations	1. Why are exponential and logarithmic functions similar and different? 2. How are the properties for exponents and logarithms similar and different? 3. What is the importance of being able to model data in more than one form? 4. What situations in the real world can be modeled by exponential and logarithmic functions?
4	***Begin Trigonometric Functions***	
	• The "Unit Circle" is circle with radius of one unit that is a tool used in understanding trigonometric ratios of angles found in right triangles. • Angle measures can be expressed in degrees or in radians. • Pythagorean Theorem and trigonometric ratios can be used to find distances/lengths of the sides of right triangles, and trig ratios can also be used to find angle measures of a triangle.	1. How does the Pythagorean Theorem relate to the Pythagorean Identities? 2. What is a "radian" and what is the significance of a "radian" measure? 3. What is the significance of the unit circle? 4. For what purpose are trigonometric ratios used? 5. What information is needed to find an angle measure using trig ratios? To find a side length of a triangle using trig ratios? To find a side length of a triangle using Pythagorean Theorem?
5	***Trigonometric Functions***	
	• Trigonometric functions have unique and recognizable graphs. • Trigonometric functions can be used to model real world situations such as amplitude and frequency of sound waves and the movement of pendulums and Ferris wheels. • Trigonometric functions are periodic.	1. How do you determine the period of a trigonometric function? 2. How many ways can you represent a particular trigonometric function? 3. How can trigonometric graphs be used to solve trigonometric equations? 4. What are some real world situations that can be modeled by trig functions?

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7	***Trigonometric Functions***	
	• Trigonometric identities can be used to simplify expressions and solve equations	1. How are the trigonometric identities used? 2. How many different methods or strategies can be used to solve a trigonometric equation? 3. Ambiguous case, determine the number of possible solutions of a particular triangle.
8	***Vectors***	
	• Vectors are used to model situations involving two or more quantities. • Vectors can be represented multiple ways.	1. How are vectors used to model situations and why would you choose to use them? 2. How many different ways can you express a vector?
9	***Polar, Parametrics and Conics***	
	• Conics model many real world situations. • A parametric set of equations determines when an object will be at a specific location. • Polar equations simplify conic equations.	1. What real world situations can you model with conic sections? 2. Why would you choose to use parametric equations to model a situation? 3. How does a parametric equation describe the path of an object? 4. How do you convert from one form of an equation to another form of an equation using parametric, polar, and rectangular?
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11	***Sequences and Series***	
	• Sequences are patterns that relate the term number to the term itself, or relate one term to the next. • Series are sums of sequences. • Some series converge and some diverge.	1. What is the difference between recursive and explicit? 2. What is the difference between arithmetic and geometric sequences? 3. What distinguishes a sequence from a series? 4. How is a limit related to an infinite geometric series?
12	***Limits, Sequences and Series***	
	• The limit of a function can be determined by calculating the value of a function for x-values that are very close to a given x-value. • There are a variety of techniques such as dividing out, rationalizing, and graphical techniques to evaluate and approximate limits. • Limits can also be found by studying the behavior of different parts of a function as x increases or decreases without bound. • Limits can be used to find expected values of functions.	1. How can you find and interpret the limit of a function for a certain value of x? 2. How can you evaluate limits that cannot be solved using direct substitution? 3. How do you find the limits of infinite functions and the limits of sequences? 4. What is the significance of the binomial theorem?