Precalculus
Year at a Glance (YAG)
2023-2024

First Semester	Second Semester
1st Nine Weeks	**3rd Nine Weeks**

TEKS
P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P2A, P2B, P2C, P2D, P2E, P2F, P2G, P2I, P3A

Chapter 1 (1.1-1.6): Functions and Mathematical Models (20 days)
- Work with functions that are defined graphically, algebraically, numerically, or verbally.
- Make connections among the algebraic equation for a function, its name, and its graph.
- Transform a given pre-image function so that the result is a graph of the image function that has been dilated by given factors and translated by given amounts.
- Given two functions, graph and evaluate the composition of one function with the other.
- Given a function, find its inverse relation, and tell whether the inverse relation is a function. Graph parametric equations on a grapher, and use parametric equations to graph the inverse of a function.
- Given a function, transform it by reflection.

TEKS
P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P2G, P2I, P2O, P2P, P4C, P4D, P4E, P4F

Chapter 5 (5.1-5.5): Periodic functions and Right Triangle Problems (13 days)
- Find the function that corresponds to the graph of a sinusoid and graph it on your grapher.
- Given an angle of any measure, draw a picture of that angle.
- Extend the definitions of sine and cosine to any angle.
- Be able to find values of the six trigonometric functions approximately, by calculator, for any angle and exactly for certain special angles.
- Given two sides of a right triangle or a side and an acute angle, find measures of the other sides and angles.

P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.2F, P.2G, P.2I, P.2J, P.2M, P.2N, P.5G, P.5H, P.5I, P.5L

Chapter 2 (2.1-2.6): Properties of Elementary Functions (13 days)
- Discover patterns in the graphs of linear, quadratic, power, and exponential functions.
- Given the graph of a function, know whether the function is exponential, power, quadratic, or linear and find the particular equation algebraically.
- Given a set of regularly spaced *x*-values and the corresponding *y*-values, identify which type of function they fit (linear, quadratic, power, or exponential).
- Find other function values without necessarily finding the particular equation.
- Learn the properties of base-10 logarithms.
- Use logarithms with base 10 or other bases to solve exponential or logarithmic equations.
- Show that logarithmic functions have the multiply-add property,

P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.2E, P.2G, P.2H, P.2I, P.2O, P.2P, P4A, P4B, P4C, P4D, P4E, P4F, P.5N

Chapter 6 (6.1-6.8): Applications of Trigonometric and Circular Functions (26 days)
- Learn the meanings of amplitude, period, phase displacement, and cycle of a sinusoidal graph.
- Given any one of these sets of information about a sinusoid, find the other two:
  - the equation
  - the graph
  - the amplitude, period or frequency, phase displacement, and sinusoidal axis
- Plot the graphs of the tangent, cotangent, secant, and cosecant functions, showing their behavior when the function value is undefined.
- Given an angle measure in degrees, convert it to radians, and vice versa.
- Given an angle measure in radians, find trigonometric function values.
- Learn about the circular functions and their relationship to trigonometric functions.
- Given the equation of a circular or trigonometric function and a particular value of *y*, find

TEKS		TEKS	
P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.2I, P.2N	and find particular equations algebraically. **Chapter 3 (2.7, 3.1, 3.3): Fitting Functions to Data** (5 days) ● Fit a logistic function to data for restrained growth. ● Find the equation of the best-fitting linear function for a set of points by running a linear regression on your grapher. ● Given a set of data, make a scatter plot, identify the type of function that could model the relationship between the variables, and use regression to find the particular equation that best fits the data.		specified values of x or θ graphically, numerically, and algebraically. ● Given a verbal description of a periodic phenomenon, write an equation using the sine or cosine function and use the equation as a mathematical model to make predictions and interpretations about the real world. ● ***Given information about a rotating object or connected rotating objects, find linear and angular velocities of points on the objects.*

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<tr><td colspan="2" style="background:yellow"><h1>2nd Nine Weeks</h1></td><td colspan="2" style="background:yellow"><h1>4th Nine Weeks</h1></td></tr>
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TEKS		TEKS	

P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.2F, P.2G, P.2I, P.2J, P.2K, P.2L, P.2M, P.2N, P.5J	**Chapter 4 (4.1-4.7): Polynomial and Rational Functions** (21 days)
	● Discover some properties of polynomial and rational functions and their graphs.
	● Review the properties, graphs, and techniques associated with quadratic functions.
	● Given a polynomial function,
	  ○ determine from the graph what degree it might be, and vice versa.
	  ○ find the zeros from the equation or the graph.
	● Given a set of points, find the equation for the polynomial function that fits the data exactly or fits best for a given degree.
	● Discover some properties of polynomial and rational functions and their graphs.
	● Multiply, divide, add, and subtract rational expressions, and resolve proper algebraic fractions into the sum of two or more partial fractions.
	● Given a rational algebraic function f, find x for a given value of $f(x)$.
		P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.2H, P.2I, P.2O, P.2P, P.4A, P.4E, P.4F, P.5M, P.5N	**Chapter 7/8 (7.1-7.4, 8.3, 8.6): Trigonometric Function Properties and Identities/Properties of Combined Sinusoids** (20 days)
			● Investigate the sum of the squares of the cosine and sine of the same argument.
			● Derive algebraically three kinds of properties expressing relationships among trigonometric functions.
			● Given a trigonometric expression, transform it into an equivalent expression whose form is perhaps simpler or more useful.
			● Find algebraically or numerically the solutions to equations involving circular or trigonometric sines, cosines, and tangents of one argument.
			● ***For trigonometric functions f, derive and learn properties for*
			  ○ $f(-x)$ *in terms of* $f(x)$
			  ○ $f(90^\circ - \theta)$ *in terms of functions of* θ, *or* $f(\frac{\pi}{2} - x)$ *in terms of functions of* x
			  ○ $f(A+B)$ *and* $f(A-B)$ *in terms of functions of A and functions of B*
			● ***Derive formulas for* $cos2A,\ sin2A,$ *and* $tan2A$ *in terms of functions of A.*

P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.5A, P.5B, P.5C, P.5D, P.5E, P.5F	**Chapter 15 (15.1-15.3): Sequences and Series** (14 days) ● Given a few terms in a sequence or series of numbers, find more terms. ● Given a series, find the sum of a specified number of terms. ● Represent sequences explicitly and recursively.	P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.4F, P.4G, P.4H	**Chapter 9 (9.1-9.5, 9.7): Triangle Trigonometry** (10 days) ● Given two sides and the included angle of a triangle, find by direct

- Find a term in a sequence given its term number.
- Find the term number of a given term in a sequence
- Given a series, find a specified partial sum, or find the number of terms if the partial sum is given.
- Use sigma notation to write partial sums.
- Given a power of a binomial, expand it as a binomial series.

P.1A, P.1B, P.1C, P.1D, P.1E, P.1F, P.1G, P.4F, P.4H, P.4I, P.4J, P.4K

measurement the length of the third side of the triangle.
- Given two sides and the included angle of a triangle, derive and use the law of cosines to find the length of the third side.
- Given three sides of a triangle, find an angle measure.
- Given the measures of two sides and the included angle, or the measures of all three sides, find the area of the triangle.
- Given the measure of angle angle, the length of the side opposite this angle, and one other piece of information about a triangle, find the other side lengths and angle measures.
- Given two sides and an non-included angle, calculate the possible lengths of the third side.
- Given a real-world problem, identify a triangle and use the appropriate technique to calculate unknown side lengths and angle measures.

Chapter 9.6: Vectors (10 days)
- **Given the components of a vector, find the magnitude and direction.*
- **Given the magnitude and direction of a vector, find the components.*
- **Given the components of a vector, add, subtract, and multiply vectors.*
- **Given the magnitude and direction of a vector, find the components as well as the magnitude and direction of the resultant.*
- **Given a direction, convert it to navigational bearings.*
- **Given navigational bearings, convert it to a direction.*
- **Given the magnitude and bearing of a vector, find the components as well as the magnitude and bearing of the resultant.*

Resources

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
• textbook: Precalculus with Trigonometry Concepts and Applications	• textbook: Precalculus with Trigonometry Concepts and Applications	• textbook: Precalculus with Trigonometry Concepts and Applications • **CSCOPE	• textbook: Precalculus with Trigonometry Concepts and Applications • **CSCOPE