

Preparation for Calculus



Description

In this unit, students will prepare for calculus by reviewing concepts from the previous math classes. These skills include: Graphs and models, linear models and rate of change, functions and their graphs, and review of trigonometric functions. Students will also learn how to use a graphing calculator as a tool to graph, investigate math ideas, and problem solve.

Unit Priority Standards

- HSF.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
- 8.F.A.3 Interpret the equation $y = mx + b$ as defining linear function, whose graph is a straight line; give examples of functions that are not linear.
- HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative, relative maximums and minimums, symmetries, end behavior, and periodicity.
- HSF.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.
- HSF.TF.A.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
- HSF.TF.A.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
- Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$, given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.

Unit Transfer Goals

- Use a problem-solving model that incorporates analyzing the information given, determining a plan or strategy, solving the problem, justifying the solution, and checking for reasonableness of the answer.
- Communicate and organize mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate in a professional manner.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Unit Essential questions	
<ol style="list-style-type: none"> 1. What are the characteristics of the graphs? 2. Can you identify different types of transformation of functions? 3. What are six trigonometric functions? 	
Acquisition of Knowledge Skill	
<i>Students will know...</i> <ol style="list-style-type: none"> 1. Identify the characteristics of the graphs. 2. Understand the definition of the six trig functions. 3. Identify different types of transformation of functions. 	<i>Students will be skilled at...I can...</i> <ol style="list-style-type: none"> 1. Sketch the graph of the equation. 2. Interpret mathematical models for real-life data. 3. Find the intercepts of a graph. 4. Test a graph for symmetry with respect to an axis and the origin. 5. Write equations of lines that are parallel and perpendicular to a given line. 6. Find domain and range of function using function notation. 7. Evaluate, solve, & graph trig functions.

Unit Plan

Week 1: 24-27 August	Graphs and Models What are the characteristics of the graphs? Can you identify different types of transformation of functions?
Learning Target(s):	<ul style="list-style-type: none"> • Day 1: Introduction & Graphs • Day 2: Graphs and Models
Acquired Knowledge & Skills:	<ul style="list-style-type: none"> • Sketch the graph of the equation. • Find the intercepts of the graph. • Interpret mathematical models for real-life data.
Activities:	<ul style="list-style-type: none"> • Guided Notes • Practice problems from the textbook • Exit Ticket
Due Dates and Assessments:	<ul style="list-style-type: none"> • HW: problems from the textbook

Week 2: 30 August - 3 September	Linear Models, Functions and Their Graphs, Review of Trigonometric Functions
Learning Target(s):	<ul style="list-style-type: none"> • Day 1: Linear Models and Rate of Change • Day 2: Functions and Their Graphs • Day 3: Functions and Their Graphs Day 2
Acquired Knowledge & Skills:	<ul style="list-style-type: none"> • Write equations of lines that are parallel and perpendicular to a given line. • Find domain and range of function using function notation. • Identify different types of transformation of functions.
Activities:	<ul style="list-style-type: none"> • Guided Notes • Practice problems from the textbook • Exit Tickets
Due Dates and Assessments:	<ul style="list-style-type: none"> • HW: problems from the textbook

Week 3: 6 -10 September	Review of Trigonometric Functions
Learning Target(s):	<ul style="list-style-type: none"> • Day 1: Review of Trig Functions Day • Day 2: Review of Trig Functions Day 2 • Day 3: Unit 1 Review
Acquired Knowledge & Skills:	<ul style="list-style-type: none"> • Understand the definition of the six trig functions. • Evaluate, solve, & graph trig functions.
Activities:	<ul style="list-style-type: none"> • Guided Notes • Practice problems from the textbook • Exit Tickets • Preparation for Calculus Test • Unit 1 Assessment
Due Dates and Assessments:	<ul style="list-style-type: none"> • Unit 1 Review due before the test

Week 4: 13 - 17 September	Review of Trigonometric Functions
Learning Target(s):	<ul style="list-style-type: none"> • Day 1: Unit 1 Test • Day 2 & Day 3 on Unit 2 Assignment Packet
Acquired Knowledge & Skills:	<ul style="list-style-type: none"> • Understand the definition of the six trig functions. • Evaluate, solve, & graph trig functions.
Activities:	<ul style="list-style-type: none"> • Guided Notes • Practice problems from the textbook • Exit Tickets • Preparation for Calculus Test • Unit 1 Assessment
Due Dates and Assessments:	<ul style="list-style-type: none"> • Unit 1 Review due before the test

Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
Summative <ul style="list-style-type: none">• Check-In<ul style="list-style-type: none">◦ Check the student's understanding throughout the unit.• Unit Test	Formative <ul style="list-style-type: none">• Warm Ups<ul style="list-style-type: none">◦ 2 or 3 problems (either preview of the lesson or concept from the previous lesson) on the board or posted on Google Classroom.• Exit Tickets<ul style="list-style-type: none">◦ Provide feedback to the students after the lesson.• Class participation & Discussion• Circulating classroom to monitor student's work

Additional Resources

Here are additional resources to help you in this unit.	
Khan Academy	Video and practice to prepare for calculus.
Delta Math	Great practice website. Please let me know (via email) if you'd like me to assign specific topics here.
Math is Fun	Great tool for Calculus concepts explained in easy language. Plus it has practices for each concept.