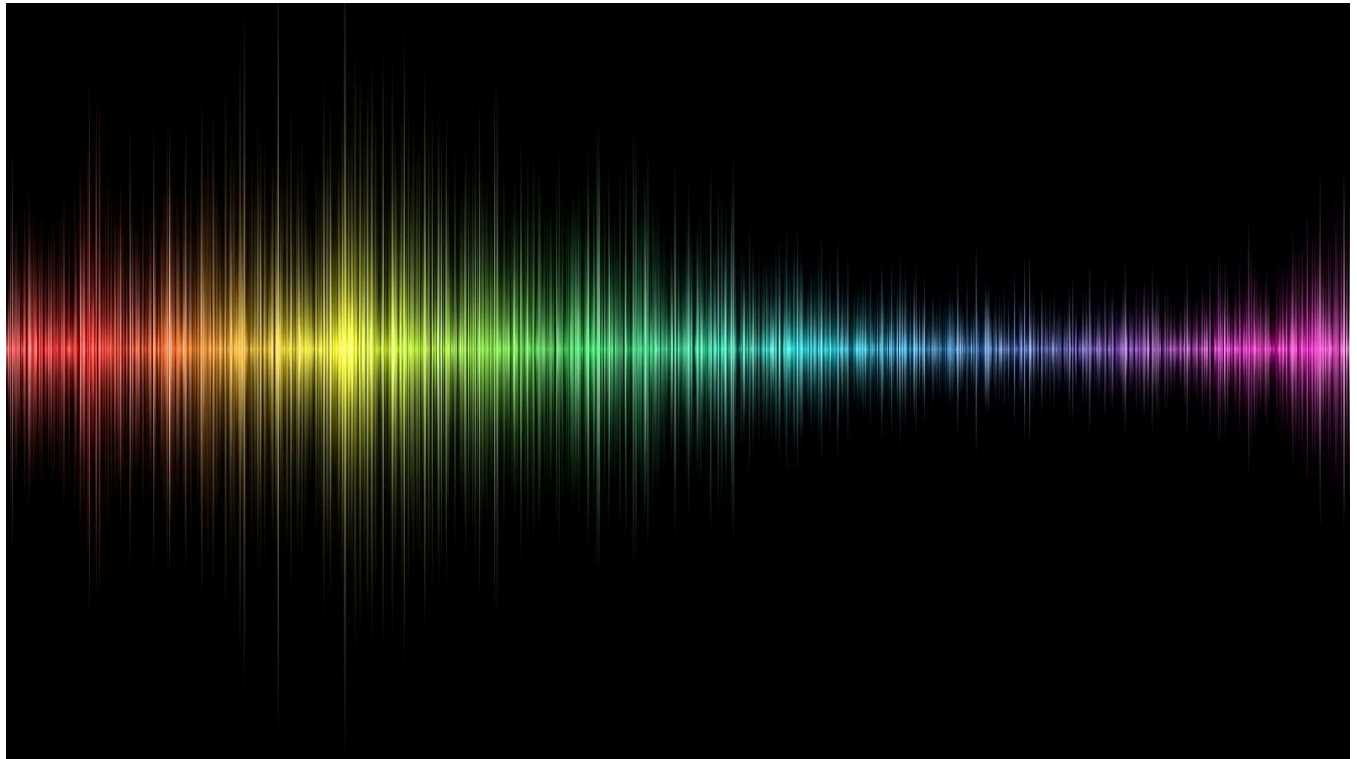


Unit 4: Trigonometric Functions



Unit 4 Introduction

Trigonometry was first developed for the purpose of navigation using astronomy. Trigonometry is the study of the angles and sides of triangles. Trigonometry is used in many different applications including, 3D modeling, design, architecture, physics, modelling waves including light waves and sound waves, and many more areas. In this unit, students will solve problems involving triangles, graph trigonometric functions, and use inverse trigonometric functions to help them solve problems in real life contexts.

Unit Priority Standards

Standard	Skills	Check
F-IFC7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	
F-BFA1	Write a function that describes a relationship between two quantities. (C) (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.	
F-TFA3	(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number	
F-BFB4	Find inverse functions. (B) (+) Verify by composition that one function is the inverse of another. (C) (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. (D) (+) Produce an invertible function from a non-invertible function by restricting the domain	
F-TFB7	(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.	

Unit Transfer Goals

- Apply mathematics to problems that arise in everyday life, society, and the workplace.
- 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	
1. How can the unit circle be used to represent trigonometric ratios? 2. How can trigonometry be used to solve problems? 3. How can transformations be applied to the graphs of the six trigonometric functions?	
Acquisition of Knowledge Skill	
<i>Students will know...</i> <ol style="list-style-type: none"> 1. The six trigonometric ratios 2. How angles are defined and how to convert angles 3. How the unit circle relates to the graphs of trigonometric functions 4. Transformations on trigonometric functions 	<i>Students will be skilled at...I can...</i> <ol style="list-style-type: none"> 1. Use the six trigonometric ratios to solve problems 2. Use both radians and degrees 3. Graph trigonometric functions 4. Using inverse trigonometric ratios to solve problems 5. Solve problems involving triangles

Unit Plan

Week 1: 12/7-12/10 (2 classes)	Focus: Right Triangle Trigonometry and Angles How can right trigonometry be used to solve problems?
Learning Target(s):	4.1 Right Triangle Trigonometry 4.2 Degrees and Radians
Acquired Knowledge and Skills:	<input type="checkbox"/> Find values of trigonometric functions for acute angles of right triangles <input type="checkbox"/> Solve right triangles <input type="checkbox"/> Use angle measures to solve real-world problems.
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-In

Week 2: 12/13-12/17 No classes 12/17	Focus: The Unit Circle Happy Winter Break! How can the unit circle be used to represent trigonometric ratios?
Learning Target(s):	4.3 Trigonometric Functions on the Unit Circle
Acquired Knowledge and Skills:	<input type="checkbox"/> Find values of trigonometric functions for any angle. <input type="checkbox"/> Find values of trigonometric functions using the unit circle
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-In

Week 3: 1/10-1/14	Focus: Graphing Trigonometric Ratios How can transformations be applied to the graphs of the six trigonometric functions?
Learning Target(s):	4.4 Graphing Sine and Cosine Functions 4.5 Graphing Other Trigonometric Functions
Acquired Knowledge and Skills:	<input type="checkbox"/> Graph Sine, Cosine, Tangent, Secant, Cosecant, and Cotangent <input type="checkbox"/> Use sinusoidal functions to solve problems <input type="checkbox"/> Graph damped trigonometric functions
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-In

Week 4: 1/17-1/21 <small>No Classes 1/19-1/24</small>	Focus: Inverse Trigonometric Functions How can right trigonometry be used to solve problems?
Learning Target(s):	4.6 Inverse Trigonometric Functions
Acquired Knowledge and Skills:	<input type="checkbox"/> Evaluate and graph inverse trigonometric functions <input type="checkbox"/> Find compositions of trigonometric functions
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-In

Week 5: 1/24-1/28 <small>No Classes 1/19-1/24</small>	Focus: Inverse Trigonometric Functions <small>End of Q1 1/25</small> How can right trigonometry be used to solve problems?
Learning Target(s):	4.7 The Law of Sines and Cosines Review
Acquired Knowledge and Skills:	<input type="checkbox"/> Solve oblique triangles by using the Law of Sines or the Law of Cosines <input type="checkbox"/> Find areas of oblique triangles
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-In

Week 6: 2/2-2/3	Focus: Trigonometric Function Test
Learning Target(s):	Trigonometric Functions Test
Activities:	Trigonometric Functions Test

Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
Summative Chapter 4 Test <ul style="list-style-type: none"> Assesses skills and knowledge learned in the unit. 	Formative Desmos Activities <ul style="list-style-type: none"> Non-graded activities will provide myself and students with information about their understanding. These will also be used as discussion points in class. Q&A <ul style="list-style-type: none"> Questions asked randomly to students will help with review and reinforce knowledge. Check-In <ul style="list-style-type: none"> Gives students focused feedback on their progress in acquiring skills and knowledge. Discussion <ul style="list-style-type: none"> Small group and class discussions provide myself and students with information about their ability to communicate understandings and inferences.

Extended Learning Opportunities

Website Description	Website
Khan Academy: videos & exercises to practice	Khan Academy
Albert IO – Practice Questions	Albert IO
Wolfram Alpha - Mathematical computation engine	Wolfram Alpha