



Math Weekly Lesson Preparation Guide

Teacher Name: Kimberly West	Grade: 11 th /12 th Precalculus
Week of: March 24 th thru 28 th	Lesson: Fundamental Trigonometric Identities

Purpose: The Weekly Lesson Preparation Guide is to provide a structure that encourages teachers to think through and internalize the daily/weekly instructional expectations.

Planning Questions			
<p>1. Which specific Tennessee standard(s) are being addressed in this lesson? What is the focus of this lesson? What will the lesson objective be for each day?</p>	<p>P.G.TI.A.1 Apply trigonometric identities to verify identities and solve equations. Identities include: Pythagorean, reciprocal, quotient, sum/difference, double-angle, and half-angle</p> <p>Vocabulary</p> <ul style="list-style-type: none"> *Identities *Cofunction Identities *Reciprocal <p>OBJECTIVE: I can use fundamental identities to evaluate trigonometric expressions. I can use fundamental identities to simplify trigonometric expressions.</p>		
<p>Modeling:</p> <p>2. What specific tasks/problems will you use to reveal understanding of the grade-level standard(s)? (refer to the Instructional Focus Document Evidence of Learning Statements</p>	<div style="background-color: #e1f0f8; padding: 10px; border: 1px solid #ccc;"> <p style="margin: 0;">Fundamental Trigonometric Identities Part A</p> <ul style="list-style-type: none"> • Uses for identities <ul style="list-style-type: none"> • Evaluate trig functions • Simplify trig expressions • Develop more identities • Solve trig equations </div>		

Adapted from TDOE Unit and Lesson Preparation Guides

Click [here](https://bestforall.tnedu.gov/) to access 2023 Revised Math Standards Resources: <https://bestforall.tnedu.gov/>

September 2024

Fundamental Trigonometric Identities

Reciprocal Identities

$$\begin{aligned} \sin u &= \frac{1}{\csc u} & \csc u &= \frac{1}{\sin u} \\ \cos u &= \frac{1}{\sec u} & \sec u &= \frac{1}{\cos u} \\ \tan u &= \frac{1}{\cot u} & \cot u &= \frac{1}{\tan u} \end{aligned}$$

Quotient Identities

$$\tan u = \frac{\sin u}{\cos u} \quad \cot u = \frac{\cos u}{\sin u}$$

Pythagorean Identities

$$\begin{aligned} \sin^2 u + \cos^2 u &= 1 \\ \tan^2 u + 1 &= \sec^2 u \\ 1 + \cot^2 u &= \csc^2 u \end{aligned}$$

Fundamental Trigonometric Identities

Even/Odd Identities

$$\begin{aligned} \cos(-u) &= \cos u \\ \sec(-u) &= \sec u \\ \sin(-u) &= -\sin u \\ \tan(-u) &= -\tan u \\ \csc(-u) &= -\csc u \\ \cot(-u) &= -\cot u \end{aligned}$$

Cofunction Identities²

$$\begin{aligned} \sin\left(\frac{\pi}{2} - u\right) &= \cos u \\ \cos\left(\frac{\pi}{2} - u\right) &= \sin u \\ \tan\left(\frac{\pi}{2} - u\right) &= \cot u \\ \cot\left(\frac{\pi}{2} - u\right) &= \tan u \\ \sec\left(\frac{\pi}{2} - u\right) &= \csc u \\ \csc\left(\frac{\pi}{2} - u\right) &= \sec u \end{aligned}$$

Cofunction identities are set of trig. identities that relate the values of trigonometric functions of complementary angles. Two angles are complementary if their sum is 90° , or $\frac{\pi}{2}$.

The cofunction identities are based on the idea that for any angle θ :

$$\begin{aligned} \sin(90^\circ - \theta) &= \cos(\theta) \\ \cos(90^\circ - \theta) &= \sin(\theta) \\ \tan(90^\circ - \theta) &= \cot(\theta) \\ \cot(90^\circ - \theta) &= \tan(\theta) \\ \sec(90^\circ - \theta) &= \csc(\theta) \\ \csc(90^\circ - \theta) &= \sec(\theta) \end{aligned}$$



Fundamental Trigonometric Identities

EXAMPLE:

- Simplify: $\frac{1 + \tan^2 \theta}{\sec \theta}$



Fundamental Trigonometric Identities

EXAMPLE:

- Simplify $\frac{\sec^2 x - 1}{\sin^2 x}$



Fundamental Trigonometric Identities

EXAMPLE:

- Simplify $\sin \varphi (\csc \varphi - \sin \varphi)$



Fundamental Trigonometric Identities

EXAMPLE:

- Simplify $\cos\left(\frac{\pi}{2} - x\right) (\sec x)$

3. Practice (student task)	<p>*Selective Practice Problems: Board-work/ Handouts/Quizizz/Khan Academy</p> <p>*Look and listen for proper steps and vocabulary used to explain each step in the problem-solving process</p>		
Additional Considerations			
If your lesson contains homework, how will you utilize the work? Will you need to send scaffolding notes home? Is there a strategy you can use to maximize homework?	<p>Homework will be utilized by:</p> <p>Align with Learning Objectives: Ensure that homework directly relates to the concepts taught in class, allowing students to apply their learning.</p> <p>Variety of Tasks: Include different types of problems (e.g., practice, application, extension) to cater to various levels of understanding and to reinforce the concept from multiple angles.</p> <p>Scaffolded Problems: Start with easier problems and gradually increase difficulty. This helps build confidence and understanding before tackling more complex tasks.</p> <p>Extension Challenges: Include a few challenging problems that encourage critical thinking and exploration beyond the basic concepts.</p>		