

Unit 7: Trig Identities

Lesson 1: Establishing Trig Identities **MA3A5**

EQ:

RECALL: Complete the following Fundamental Identities (You Learned these in Unit 5)

- Reciprocal Identities

$\sin \theta = \underline{\hspace{1cm}}$     $\cos \theta = \underline{\hspace{1cm}}$     $\tan \theta = \underline{\hspace{1cm}}$     $\csc \theta = \underline{\hspace{1cm}}$     $\sec \theta = \underline{\hspace{1cm}}$     $\cot \theta = \underline{\hspace{1cm}}$

Therefore:  $\sin \theta \csc \theta = \underline{\hspace{1cm}}$     $\cos \theta \sec \theta = \underline{\hspace{1cm}}$     $\tan \theta \cot \theta = \underline{\hspace{1cm}}$

- Ratio Identities (Write in terms of sine and cosine.)

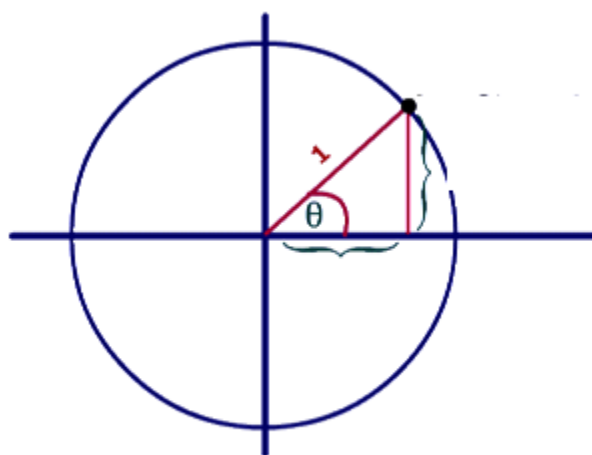
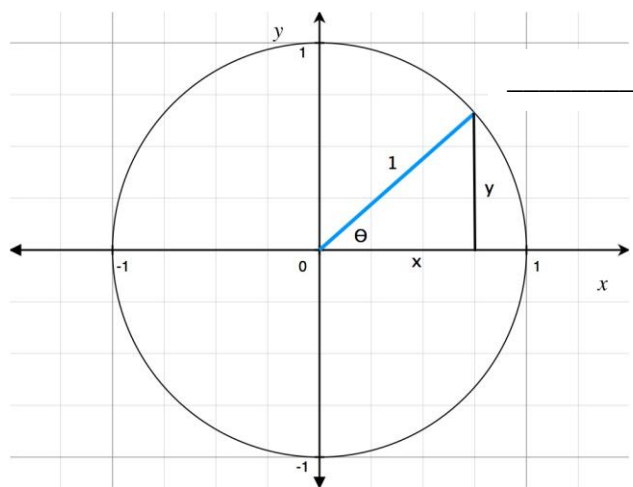
$\tan \theta = \underline{\hspace{1cm}}$     $\cot \theta = \underline{\hspace{1cm}}$

- Even/Odd Identities (Think about their graphs.)

$\sin (-\theta) = \underline{\hspace{1cm}}$     $\cos (-\theta) = \underline{\hspace{1cm}}$     $\tan (-\theta) = \underline{\hspace{1cm}}$

$\csc (-\theta) = \underline{\hspace{1cm}}$     $\sec (-\theta) = \underline{\hspace{1cm}}$     $\cot (-\theta) = \underline{\hspace{1cm}}$

- Pythagorean Identities



Recall: Pythagorean Theorem

Therefore: \_\_\_\_\_

\_\_\_\_\_

I. "Grandmama" or "Madea" \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

❖ Derivations:

Solve for  $\sin^2 \theta$ : \_\_\_\_\_ Solve for  $\cos^2 \theta$ : \_\_\_\_\_

II. Divide Grandmama by  $\sin^2 \theta$ : \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

❖ Derivations:

Solve for  $\cot^2 \theta$ : \_\_\_\_\_ Solve for 1: \_\_\_\_\_

III. Divide Grandmama by  $\cos^2 \theta$ : \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

❖ Derivations:

Solve for  $\tan^2 \theta$ : \_\_\_\_\_ Solve for 1: \_\_\_\_\_

Ex. Simplify using trig identities. Show all steps.

1.  $\sin \alpha \sec \alpha \cot \alpha$

2.  $(\csc \beta - 1)(\csc \beta + 1)$

3.  $\frac{\cot x}{\cos x}$

4.  $\csc x(\sec x - \cos x)$

$$5. \quad \frac{1 + \cot^2 \theta}{1 + \tan^2 \theta}$$

$$6. \quad \frac{\cos \alpha}{\csc \alpha} - \frac{\sin \alpha}{\sec \alpha}$$

$$7. \quad \frac{\csc x - \sin x}{\cos x}$$

Assignment: p. 381 #19 - 44; PW #1,2,3,4: Simplify Trig Identities