Student: _____ **Date:** _____	**Instructor:** Joe Betters **Course:** Pre-Calculus Pre AP (Master Course)	**Assignment:** 7.4 Classwork (Day 1)

1. Establish the identity.

$$\frac{2\csc\theta}{\sec\theta}+\frac{4\cos\theta}{\sin\theta}=6\cot\theta$$

Write the left side of the identity in terms of sine and cosine. Rewrite the numerator and denominator separately.

$$\frac{\quad}{\quad}+\frac{4\cos\theta}{\sin\theta}$$ (Do not simplify.)

Simplify the fraction from the previous step such that both the fractions have the common denominator $\sin\theta$.

$$\frac{\quad}{\sin\theta}+\frac{4\cos\theta}{\sin\theta}$$

The expression from the previous step then simplifies to $6\cot\theta$ using what?

- ○ **A.** Addition and an Even-Odd Identity
- ○ **B.** Addition and a Pythagorean Identity
- ○ **C.** Addition and a Quotient Identity
- ○ **D.** Addition and the Cancellation Property
- ○ **E.** Addition and a Reciprocal Identity

2. Establish the identity.

$$\frac{\sec\theta}{1+\sin\theta}=\frac{1-\sin\theta}{\cos^3\theta}$$

Write the right side quotient as a product of two fractions.

$$\frac{1}{\cos\theta}\cdot\frac{\quad}{\quad}$$ (Do not simplify.)

Apply an appropriate Pythagorean identity to the right side of the previous step. Simplify by canceling common factors.

$$\frac{1}{\cos\theta}\cdot\frac{1}{\quad}$$ (Simplify your answer.)

The expression from the previous step then simplifies to $\frac{\sec\theta}{1+\sin\theta}$ using what?

- ○ **A.** Quotient Identity
- ○ **B.** Even-Odd Identity
- ○ **C.** Reciprocal Identity
- ○ **D.** Pythagorean Identity
- ○ **E.** Cancellation Property

3. A searchlight casts a spot of light on a wall located 80 meters from the searchlight. The acceleration $\ddot{r}$ of the spot of light is found to be $\ddot{r} = 1050 \tan\theta\left(2\tan^2\theta + 1\right)$. Show that this is equivalent to $\ddot{r} = \dfrac{1050\left(1 + \csc^2\theta\right)}{\cot^3\theta}$.

Rewrite $1050 \tan\theta\left(2\tan^2\theta + 1\right)$ by applying a reciprocal identity.

$$\frac{1050}{\quad}\left(\frac{2}{\quad} + 1\right)$$

Write the expression from the previous step as a single fraction.

$$\frac{1050\left(2 + \quad\right)}{\quad}$$

The fraction from the previous step then simplifies to $\dfrac{1050\left(1 + \csc^2\theta\right)}{\cot^3\theta}$ using what?

- ○ **A.** Cancellation Property
- ○ **B.** Even-Odd Identity
- ○ **C.** Reciprocal Identity
- ○ **D.** Pythagorean Identity
- ○ **E.** Quotient Identity

1. $\frac{2}{\sin \theta}$

   $\frac{1}{\cos \theta}$

   $2 \cos \theta$

   C. Addition and a Quotient Identity

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2. $1 - \sin \theta$

   $\cos^2 \theta$

   $1 + \sin \theta$

   C. Reciprocal Identity

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3. $\cot \theta$

   $\cot^2 \theta$

   $\cot^2 \theta$

   $\cot^3 \theta$

   D. Pythagorean Identity

7.4 classwork day 1

① $\dfrac{2\csc\theta}{\sec\theta} + \dfrac{4\cos\theta}{\sin\theta} = 6\cot\theta$

$\dfrac{2\left(\frac{1}{\sin\theta}\right)}{\left(\frac{1}{\cos\theta}\right)} + \dfrac{4\cos\theta}{\sin\theta} = 6\cot\theta$

$\dfrac{2\cos\theta}{\sin\theta} + \dfrac{4\cos\theta}{\sin\theta} = 6\cot\theta$

$2\cot\theta + 4\cot\theta = 6\cot\theta$

Quotient

$6\cot\theta = 6\cot\theta$

Addition

C Addition and Quotient Identity

7.4 classwork day 1 continued

② $\dfrac{\sec\theta}{1+\sin\theta} = \dfrac{1-\sin\theta}{\cos^3\theta}$

$= \dfrac{1}{\cos\theta} \cdot \dfrac{1-\sin\theta}{\cos^2\theta}$

$= \dfrac{1}{\cos\theta} \cdot \dfrac{(1-\sin\theta)}{(1-\sin^2\theta)}$

$= \dfrac{1}{\cos\theta} \cdot \dfrac{(1-\sin\theta)}{(1-\sin\theta)(1+\sin\theta)}$

$= \dfrac{1}{\cos\theta} \cdot \dfrac{1}{1+\sin\theta}$

$= \dfrac{\sec\theta}{1+\sin\theta}$

$*\cos\theta = \dfrac{1}{\sec\theta}$

C reciprocal identity

7.4 classwork day 1 continued

(3) $1050 \tan\theta(2\tan^2\theta + 1)$

$\frac{1050}{\cot\theta}\left(\frac{2}{\cot^2\theta} + 1\right)$

$*\tan\theta = \frac{1}{\cot\theta}$

$\frac{1050}{\cot\theta}\left(\frac{2+\cot^2\theta}{\cot^2\theta}\right)$

$\frac{1050(2+\cot^2\theta)}{\cot^3\theta}$

$\frac{1050(2+(\csc^2\theta - 1))}{\cot^3\theta}$

$\frac{1050(1+\csc^2\theta)}{\cot^3\theta}$

(D) pythagorean Identity