No Joking Around
Trigonometric Identities

Prove each identity.

1. $\dfrac{\cot\Theta}{\cos\Theta} = \csc\Theta$

2. $\cot\Theta + \tan\Theta = \csc\Theta\sec\Theta$

3. $\sin\Theta + \dfrac{\cot\Theta}{\sec\Theta} = \csc\Theta$

4. $\dfrac{1 - \cos^2\Theta}{\cos\Theta} \cdot \csc\Theta = \tan\Theta$

5. $2\csc\Theta = \dfrac{\sin\Theta}{1 + \cos\Theta} + \dfrac{\sin\Theta}{1 - \cos\Theta}$

6. $\dfrac{\cot^2\Theta - 1}{\cot^2\Theta + 1} = 2\cos^2\Theta - 1$

Name _____

Basic Trigonometric Identities

Remember

Use the following basic identities to obtain equivalent forms.

Quotient Identities	Reciprocal Identities	Pythagorean Identities
$\tan\theta = \dfrac{\sin\theta}{\cos\theta},\ \cos\theta \neq 0$	$\csc\theta = \dfrac{1}{\sin\theta},\ \sin\theta \neq 0$	$\sin^2\theta + \cos^2\theta = 1$
$\cot\theta = \dfrac{\cos\theta}{\sin\theta},\ \sin\theta \neq 0$	$\sec\theta = \dfrac{1}{\cos\theta},\ \cos\theta \neq 0$	$1 + \tan^2\theta = \sec^2\theta$
	$\cot\theta = \dfrac{1}{\tan\theta},\ \tan\theta \neq 0$	$1 + \cot^2\theta = \csc^2\theta$

Example: $\sec\theta - \sin\theta\tan\theta$

$= \dfrac{1}{\cos\theta} - \sin\theta \cdot \dfrac{\sin\theta}{\cos\theta}$ Change to sines and cosines.

$= \dfrac{1 - \sin^2\theta}{\cos\theta}$ Combine fractions.

$= \dfrac{\cos^2\theta}{\cos\theta} = \cos\theta$ Replace numerator. Cancel $\cos\theta \neq 0$.

Connect equivalents.

1. $\tan\theta\csc\theta$ •

2. $\csc\theta\sin\theta - \sin^2\theta$ •

3. $\dfrac{\sin\theta\csc\theta}{\tan\theta}$ •

4. $\dfrac{\sec\theta}{\cot\theta + \tan\theta}$ •

5. $(1 - \cos\theta)(1 + \cos\theta)$ •

6. $\csc\theta - \cot\theta$ •

7. $\cos\theta(\tan\theta - \sec\theta)$ •

8. $\dfrac{\tan\theta + \sin\theta}{\csc\theta + \cot\theta}$ •

Z   F

X   A

B

Q

B   U

R   L

O   N   U

J   S   S

a. $\dfrac{1 - \cos\theta}{\sin\theta}$ •

b. $\sin\theta$ •

c. $\sec\theta$ •

d. $\sin\theta\tan\theta$ •

e. $\cos^2\theta$ •

f. $\dfrac{1}{\csc^2\theta}$ •

g. $\cot\theta$ •

h. $\sin\theta - 1$ •

Write the uncrossed letters in the spaces below to reveal a message.

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