Name:_____ Date:_____

M12P HW Section 6.1 Proving and Verifying Trigonometric Identities

1. What is a trigonometric Identity? What is the difference between an "identity" and an "equation"? Explain:

2. How do you prove a trigonometric Identity? Explain:

3. What is the difference between "verifying" a trig identity versus "proving a trig identity? Explain:

4. When verifying a trigonometric identity, what angle should you use? 0, 2π, $\frac{\pi}{2}$, or any angle in particular? Explain?

5. Suppose you tried to verify if a trig equation was an identity by using an arbitrary angle. If the equation wasn't equal, can you still try and prove the equation to be an identity? Explain:

6. When a trig proof has an expression with a binomial in the denominator, how should you simplify it?

   $ie:\ \frac{\cos\theta}{1-\sin\theta}$ or $\frac{\sin^2\theta}{1-\cos\theta}$

7. When a trig proof has any of the following functions, how should you simplify it? $\sin^2\theta,\ \cos^2\theta,\ \tan^2\theta$

8. When a trig proof has any of the following functions, how should you simplify it? $ie:\ \csc\theta,\ \sec\theta,\ \cot\theta$

9. How would you simplify $\frac{1}{\csc\theta},\ \frac{1}{\sec\theta},\ \frac{1}{\cot\theta}$ into $\sin\theta$ or $\cos\theta$

10. Identify which of the following equations below is a trigonometric identity?

a) $\sin^2 x + \cos^2 = 1$	b) $\sin(-x) = -\sin x$	c) $\cos(-x) = -\cos x$
d) $\cos(-x) = \cos x$	e) $\tan x = \dfrac{\sin x}{\cos x}$	f) $\tan(-x) = \tan x$
g) $\csc x = \dfrac{1}{\sin x}$	h) $\sec\theta \times \dfrac{1}{\cos\theta} = \sin\theta$	i) $\sec\theta \times \cos\theta = 1$
j) $\dfrac{\sin 2\theta}{2} = \sin\theta$	k) $\sin\theta + \cos\theta = 1$	L) $\sin 2\theta = 2\sin\theta$

11. Pick a random angle between 0 and 2pi, verify which of the following are trigonometric identities:

a) $\tan x + \cot x = \sec x \csc x$	b) $\sec^2 x + \csc^2 x = \sec^2 x \bullet \csc^2 x$
c) $\sec^2 x - \csc^2 x = \dfrac{\sec^2 x}{\csc^2 x}$	d) $\sec^2 x + \csc^2 x = (\tan x + \cot x)^2$

12. Prove the following Identities. Indicate any restrictions:

a) $\dfrac{\sin\theta + \tan\theta}{\cos\theta + 1} = \tan\theta$

b) $\dfrac{\csc\theta - 1}{\cot\theta} = \dfrac{\cot\theta}{\csc\theta + 1}$

c) $\dfrac{\csc\theta-\sin\theta}{\cot\theta}=\cos\theta$

d) $\dfrac{\sec\theta}{\tan\theta+\cot\theta}=\sin\theta$

e) $\dfrac{1-\cos\theta}{\sin\theta}=\dfrac{1}{\csc\theta+\cot\theta}$

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

g) $\dfrac{1}{1+\cos\theta}+\dfrac{1}{1-\cos\theta}=\dfrac{2}{\sin^2\theta}$

h) $1+\cos\theta=\dfrac{\sin^2\theta}{1-\cos\theta}$

i) $\dfrac{\sin\theta}{1+\cos\theta}+\dfrac{1+\cos\theta}{\sin\theta}=2\csc\theta$

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

k) $\sec\theta+\tan\theta=\dfrac{1}{\sec\theta-\tan\theta}$

L) $\tan\theta+\cot\theta=\sec\theta\csc\theta$

m) $\dfrac{\sec^2\theta-1}{\sec^2\theta}=\sin^2\theta$

p) $\dfrac{1}{1-\sin\theta}+\dfrac{1}{1+\sin\theta}=2\sec^2\theta$

q) $\left(\tan^2\theta+1\right)\left(\cos^2\theta-1\right)=-\tan^2\theta$

r) $\tan\theta+\cos\theta=\sec\theta\csc\theta$