Name______________________________________**Date**_____________________**Period**_______

Homework 10.2 Part 1

Analytically show that the equations below represent trigonometric identity statements.

1. $sec^2\,\theta\,(1 - cos^2\,\theta) = tan^2\,\theta$

$\sec^2\theta(\sin^2\theta) =$

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

$\frac{\sin^2\theta}{\cos^2\theta} =$

$\tan^2\theta = \tan^2\theta$

2. $cos\,x\,(sec\,x - cos\,x) = sin^2\,x$

$\cos x \cdot \sec x - \cos x \cdot \cos x =$

$1 - \cos^2 x =$

$\sin^2 x = \sin^2 x$

3. $cos\,\theta + sin\,\theta\,tan\,\theta = sec\,\theta$

$\frac{\cos\theta}{\cos\theta} \frac{\cos\theta}{1} + \sin \cdot \frac{\sin\theta}{\cos\theta}$

$\frac{\cos^2\theta + \sin^2\theta}{\cos\theta} =$

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

$\sec\theta = \sec\theta$

4. $(1 - cos\,\alpha)(csc\,\alpha + cot\,\alpha) = cos\,\alpha\,tan\,\alpha$

$\csc\alpha + \cot\alpha - \cos\alpha\csc\alpha - \cos\alpha\cot\alpha =$

$\frac{1}{\sin\alpha} + \cancel{\frac{\cos\alpha}{\sin\alpha}} - \cancel{\cos\alpha \cdot \frac{1}{\sin\alpha}} - \cos\alpha\frac{\cos\alpha}{\sin\alpha} =$

$\frac{1 - \cos^2\alpha}{\sin\alpha} = \cancel{\cos\alpha} \cdot \frac{\sin\alpha}{\cancel{\cos\alpha}}$

$\frac{\sin^{\cancel{2}}\alpha}{\cancel{\sin\alpha}} =$

$\sin\alpha = \sin\alpha$

5. $\sin x\,(\csc x + \sin x \sec^2 x) = \sec^2 x$

$$\sin x \cdot \csc x + \sin^2 x \sec^2 x = \sec^2 x$$

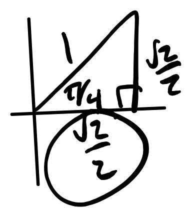
$$1 + \sin^2 x \cdot \frac{1}{\cos^2 x} = \sec^2 x$$

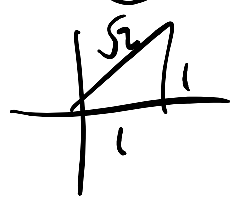
$$1 + \frac{\sin^2 x}{\cos^2 x} =$$

$$1 + \tan^2 x =$$

$$\sec^2 x = \sec^2 x$$

6. $\sec^2\theta + \csc^2\theta = \sec^2\theta \csc^2\theta$





$$\frac{\sin^2\theta}{\sin^2\theta}\cdot\frac{1}{\cos^2\theta} + \frac{1}{\sin^2\theta}\cdot\frac{\cos^2\theta}{\cos^2\theta} =$$

$$\frac{\sin^2\theta + \cos^2\theta}{\sin^2\theta\cos^2\theta} =$$

$$\frac{1}{\sin^2\theta\cos^2\theta} =$$

$$\csc^2\theta\,\sec^2\theta =$$

$$\sec^2\theta\,\csc^2\theta = \sec^2\theta\csc^2\theta$$

$$\frac{(1+\sec\theta)}{(1+\sec\theta)}\cdot\frac{1+\sec\theta}{\tan\theta} + \frac{\tan\theta}{1+\sec\theta}\cdot\frac{\tan\theta}{\tan\theta} = 2\csc\theta$$

$$\frac{(1+\sec\theta)(1+\sec\theta) + \tan^2\theta}{(1+\sec\theta)\tan\theta} =$$

$$\frac{1 + 2\sec\theta + \sec^2\theta + \tan^2\theta}{(1+\sec\theta)\tan\theta} =$$

$$\frac{2\sec\theta + \sec^2\theta + \sec^2\theta}{(1+\sec\theta)\tan\theta} =$$

$$\frac{2\sec\theta + 2\sec^2\theta}{(1+\sec\theta)\tan\theta} =$$

$$\frac{2\sec\theta\,\cancel{(1+\sec\theta)}}{\cancel{(1+\sec\theta)}\tan\theta} =$$

$$\frac{2\sec\theta}{\tan\theta} =$$

$$2\sec\theta\cdot\cot\theta =$$

$$2\cdot\frac{1}{\cancel{\cos\theta}}\cdot\frac{\cancel{\cos\theta}}{\sin\theta} =$$

$$2\cdot\frac{1}{\sin\theta} =$$

$$2\csc\theta = 2\csc\theta$$

If $\theta = \frac{\pi}{4}$, numerically show that the following equations are identities by finding the exact values of each expression. Show your work and leave your answers with rationalized denominators.

8. $\cos\theta + \sin\theta\tan\theta = \sec\theta$

$$\cos\left(\tfrac{\pi}{4}\right) + \sin\left(\tfrac{\pi}{4}\right)\tan\left(\tfrac{\pi}{4}\right) = \sec\left(\tfrac{\pi}{4}\right)$$

$$\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\cdot 1 = \frac{2}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$$

$$\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \frac{2\sqrt{2}}{2}$$

$$\frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$\sqrt{2} = \sqrt{2}$$

9. $\frac{\sin^2\theta}{\cos\theta} = \sec\theta - \cos\theta$

$$\frac{\sin^2\left(\frac{\pi}{4}\right)}{\cos\left(\frac{\pi}{4}\right)} = \sec\left(\tfrac{\pi}{4}\right) - \cos\left(\tfrac{\pi}{4}\right)$$

$$\frac{\left(\frac{\sqrt{2}}{2}\right)^2}{\frac{\sqrt{2}}{2}} = \sqrt{2} - \frac{\sqrt{2}}{2}$$

$$\frac{\cancel{4}}{2\cancel{4}}\cdot\frac{\frac{2}{\cancel{4}}}{\frac{\sqrt{2}}{\cancel{2}}} = \frac{2\sqrt{2}}{2} - \frac{\sqrt{2}}{2}$$

$$\frac{2\cdot\sqrt{2}}{2\sqrt{2}\cdot\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\frac{\cancel{2}\sqrt{2}}{\cancel{2}\cdot 2} =$$

$$\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$$