Practice – Sec 4.2
Trig Identities

After lesson 8

Name: _____

1. $\frac{\tan\alpha\csc\alpha}{\sec\alpha}$

$\frac{\frac{\sin\alpha}{\cos\alpha}\cdot\frac{1}{\sin\alpha}}{\frac{1}{\cos\alpha}} = \frac{\frac{1}{\cos\alpha}}{\frac{1}{\cos\alpha}} = 1$

2. $\cos\alpha\tan\alpha\csc\alpha$

$\cos\alpha\left(\frac{\sin\alpha}{\cos\alpha}\right)\left(\frac{1}{\sin\alpha}\right)$

1

3. $\tan x\cos^2 x$

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

$\sin x\cos x$

3 4. $\sin\theta\cot\theta$

$\sin\theta\left(\frac{\cos\theta}{\sin\theta}\right)$

$\cos\theta$

4 5. $\frac{\tan\beta}{\cot\beta}$

$\frac{\sin\beta}{\cos\beta}\div\frac{\cos\beta}{\sin\beta}$

$\frac{\sin^2\beta}{\cos^2\beta} = \tan^2\beta$

5 6. $\frac{\cos\beta}{\sec\beta-\tan\beta}$

$\frac{\cos\beta}{\frac{1}{\cos\beta}-\frac{\sin\beta}{\cos\beta}}$

$\frac{\cos\beta}{\frac{1-\sin\beta}{\cos\beta}} = \frac{\cos^2\beta}{1-\sin\beta}$

$\frac{1-\sin^2\beta}{1-\sin\beta} = \frac{(1+\sin\beta)(1-\sin\beta)}{1-\sin\beta}$

$1+\sin\beta$

6 7. $\frac{1}{\sin^2 x}-\frac{\cos^2 x}{\sin^2 x}$

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

7 8. $\frac{\cos^2\alpha}{1-\sin\alpha}$

$\frac{1-\sin^2\alpha}{1-\sin\alpha}$

$\frac{(1+\sin\alpha)(1-\sin\alpha)}{1-\sin\alpha}$

$1+\sin\alpha$

8 9. $\frac{\csc x}{1+\cot^2 x}$

$\frac{\csc x}{\csc^2 x}$

$= \frac{1}{\csc x} = \sin x$

9 10. $\sin^2\theta\cos^2\theta+\sin^4\theta$

$\sin^2\theta(\cos^2\theta+\sin^2\theta)$

$\sin^2\theta$

10 11. $\sin x+\cos x\tan x$

$\sin x+\frac{\cos x\sin x}{\cos x}$

$2\sin x$

11 12. $(1-\sin x)(1+\sin x)$

$1-\sin^2 x$

$\cos^2 x$

12 13. $\sin^4 x+2\sin^2 x\cos^2 x+\cos^4 x$

$(\sin^2 x+\cos^2 x)^2$

1^2

1

13 14. $2\csc^2\alpha-\csc^4\alpha+\cot^4\alpha$

consider writing in terms of csc

$2\csc^2\alpha-\csc^4\alpha+(\cot^2\alpha)^2$

$2\csc^2\alpha-\csc^4\alpha+(\csc^2\alpha-1)^2$

$2\csc^2\alpha-\csc^4\alpha+\csc^4\alpha-2\csc^2\alpha+1$

1

PreCalc

#6 change to $\csc^2 x$

QUICK CHECK Trig Identities

Simplify Using Trig Identities. Show all work CLEARLY. CIRCLE YOUR ANSWER!

1. $\csc x \sin x$

$\frac{1}{\sin x} \cdot \sin x$

$= 1$

2. $\tan x \cos x$

$\frac{\sin}{\cos} \cdot \cos = \sin x$

3. $\tan^2 x - \sec^2 x$

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

$= -1$

4. $(1 - \sin^2 x)(\sec x)$

$\cos^2 x \cdot \sec x$

$\cos^2 x \cdot \frac{1}{\cos x}$

$= \cos x$

5. $\sin^2 x(\csc^2 x - 1)$

$\sin^2 x \ (\cot^2 x)$

$\sin^2 x \cdot \frac{\cos^2 x}{\sin^2 x}$

$= \cos^2 x$

6. $\sin^2 x \csc^2 x - \sin^2 x$

$\frac{\sin^2 x}{\cos^2 x}$

$\sin^2 x \ (\csc^2 x - 1)$

$\sin^2 x \ (\cot^2 x - 1)$

$\sin^2 x \cdot \frac{\cos^2 x}{\sin^2 x}$

$= \frac{\sin^4 x}{\cos^2 x} = \cos^2 x$

or $\tan^2 x \sin^2 x$ if kept as $\sec x$.

7. $\tan^4 x + 2\tan^2 x + 1$

$(\tan^2 + 1)^2$

$= (\sec^2)^2$

$= \sec^4 x$

8. $\sin\theta + \cos\theta \cot\theta$

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

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

For the following problems, simplify the expression so that it is *not* a fraction.

9. $\dfrac{\cos x}{1+\sin x} + \dfrac{1+\sin x}{\cos x}$

$$\cos^2 x + \sin^2 x + 2\sin x + 1$$

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

$$= \frac{2(\sin x + 1)}{\cos x (\sin x + 1)} = 2\sec x$$

10. $\dfrac{\csc x - \sec x}{\sec x} = \left[\dfrac{1}{\sin} - \dfrac{1}{\cos}\right] \div \dfrac{1}{\cos}$

$$\frac{\cos - \sin}{\cos \cdot \sin} \cdot \cos$$

$$= \cot x - 1$$

10. $\dfrac{\sin^2 y}{1-\cos y}$

$$\frac{1-\cos^2}{1-\cos}$$

$$\frac{(1+\cos y)(1-\cos y)}{(1-\cos y)}$$

$$= 1 + \cos y$$

11. $\dfrac{\sin\theta}{\csc\theta} + \dfrac{\cos\theta}{\sec\theta}$

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

$$= 1$$