

CAN YOU LIST THE "ELITE 8"?

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

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

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

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

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

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

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

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

WHAT ABOUT THE "PYTHAGOREAN 9"?

$$\sin^2 \theta + \cos^2 \theta = 1$$

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

$$1 + \cot^2 \theta = \csc^2 \theta$$

$$1 - \sin^2 \theta = \cos^2 \theta$$

$$\sec^2 \theta - \tan^2 \theta = 1$$

$$\csc^2 \theta - \cot^2 \theta = 1$$

$$1 - \cos^2 \theta = \sin^2 \theta$$

$$\sec^2 \theta - 1 = \tan^2 \theta$$

$$\csc^2 \theta - 1 = \cot^2 \theta$$

Simplify Trig. Expressions

(These examples are for both Monday and Tuesday)

1. $\sin \theta \cdot \cos \theta \cdot \tan \theta$

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

$$\boxed{\sin^2 \theta}$$

2. $\csc x - \cos x \cot x$

PEMDAS

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

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

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

3. $\sec \theta \cos \theta - \sin^2 \theta \cot^2 \theta$

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

$$1 - \cos^2 \theta$$

$$\boxed{\sin^2 \theta}$$

4. $\cos^2 \theta + \cos^2 \theta \cot^2 \theta$

Factor

$$\cos^2 \theta (1 + \cot^2 \theta)$$

$$\cos^2 \theta (\csc^2 \theta)$$

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

$$= \boxed{\cot^2 \theta}$$

Must show
all steps

5. $\sin x (\csc x - \sin x)$

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

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

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

6. $(1 - \sin^2 x)(\sec^2 x)$

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

$$\sec^2 x - \sin^2 x \sec^2 x$$

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

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

7. $\sin \beta \csc \beta - \frac{\csc \beta}{\sin \beta}$

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

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

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

$$1 - \csc^2 \beta = \boxed{-\cot^2 \beta}$$

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

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

$$\boxed{1}$$

9. $\frac{\cot x}{1 + \csc x} + \frac{\sec x}{\csc x}$

$$\left(\frac{\cos x}{\sin x} \right) \frac{\sin x}{\sin x} + \frac{1}{\cos x} \cdot \frac{\sin x}{1} + \frac{1}{\sin x} \cdot \frac{\sin x}{1}$$

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

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

$$= \frac{1}{\cos x} = \boxed{\sec x}$$

10. $\frac{\cot x - \tan x}{\csc^2 x - \sec^2 x}$

$$\frac{\left(\frac{\cos x}{\sin x} - \frac{\sin x}{\cos x} \right) \sin^2 x \cos^2 x}{\left(\frac{1}{\sin^2 x} - \frac{1}{\cos^2 x} \right) \sin^2 x \cos^2 x}$$

$$\frac{\sin x \cos^3 x - \sin^3 x \cos x}{\cos^2 x - \sin^2 x}$$

$$\frac{\sin x \cos x (\cos^2 x - \sin^2 x)}{\cos^2 x - \sin^2 x}$$

$$\boxed{\sin x \cos x}$$