

## 7-1/7-2 SIMPLIFYING/VERIFY EXPRESSIONS

SIMPLIFY

$$\begin{aligned} & \frac{\tan \theta}{\sin \theta} \\ &= \frac{\left( \frac{\sin \theta}{\cos \theta} \right)}{\sin \theta} \\ &= \frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\sin \theta} \\ &= \frac{1}{\cos \theta} \\ &= \sec \theta \end{aligned}$$

STRATEGIES

① SUBST

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

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

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

$$= \boxed{\cos^4 \theta}$$

$$2x^3 - x^2$$

$$x^2(2x-1)$$

FACTORING

PYTHAGOREAN IDENT

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

-  $\sin^2 \theta$       -  $\sin^2 \theta$

$$\textcircled{2} \cos^2 \theta = 1 - \sin^2 \theta$$

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

SIMPLIFY

$$(1 + \cos\theta)(1 - \cos\theta)$$

$$= 1 + \cancel{\cos\theta} - \cancel{\cos\theta} - \cos^2\theta$$

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

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

VERIFY

$$\underline{\csc^2 \theta} = \cot^2 \theta + \sin \theta \csc \theta$$

$$= \frac{\cos^2 \theta}{\sin^2 \theta} + \left( \frac{\sin \theta}{1} \right) \left( \frac{1}{\sin \theta} \right)$$

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

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

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

① Pick a side

② Simplify

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

$$\rightarrow \underline{\cot^2 \theta + 1} = \underline{\csc^2 \theta}$$

$$\rightarrow \frac{\sec \theta - \csc \theta}{\csc \theta \sec \theta} = \sin \theta - \cos \theta \quad \text{VERIFY}$$

$$\frac{\frac{1}{\cos \theta} - \frac{1}{\sin \theta}}{\left(\frac{1}{\sin \theta}\right)\left(\frac{1}{\cos \theta}\right)} =$$

$$\frac{\frac{\sin \theta}{\sin \theta} \left(\frac{1}{\cos \theta}\right) - \left(\frac{1}{\sin \theta}\right) \frac{\cos \theta}{\cos \theta}}{\frac{1}{\sin \theta \cos \theta}} =$$

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

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

$$\frac{\sin \theta - \cos \theta}{\sin \theta \cos \theta} \cdot \frac{\sin \theta \cos \theta}{1} = \sin \theta - \cos \theta$$

FIND A NUMERICAL VALUE OF ONE TRIG FUNC  
OF X

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

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

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

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

$$2 \tan x \sin x + 2 \cos x = \csc x$$

$$2 \left[ \left( \frac{\sin x}{\cos x} \right) \left( \frac{\sin x}{1} \right) + \frac{\cos x}{1} \right] = \frac{1}{\sin x}$$

$$2 \left[ \frac{\sin^2 x}{\cos x} + \frac{\cos^2 x}{\cos x} \right] = \frac{1}{\sin x}$$

$$2 \left[ \frac{\sin^2 x}{\cos x} + \frac{\cos^2 x}{\cos x} \right] = \frac{1}{\sin x}$$

$$2 \left[ \frac{\sin^2 x + \cos^2 x}{\cos x} \right] = \frac{1}{\sin x}$$

$$2 \left[ \frac{1}{\cos x} \right] = \frac{1}{\sin x}$$

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

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

$$2 = \cot x$$