

Use the Fundamental Identities to simplify the expression.

Check answers on your graphing calculator.

27. $\cot x \sin x =$

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

28. $\cos y \tan y =$

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

29. $\sin \theta (\csc \theta - \sin \theta) =$

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

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

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

$$\cos^2 \theta$$

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

$$\sec^2 x (\cos^2 x)$$

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

$$1$$

31. $\frac{\cot x}{\csc x} =$

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

$$\cos x$$

32. $\frac{\sec x}{\csc x} =$

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

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

$$= \tan x$$

$$\textcircled{33} 7. \sec \alpha \cdot \frac{\sin \alpha}{\tan \alpha} =$$

$$\begin{aligned} & \downarrow \\ & \frac{1}{\cos x} \cdot \frac{\sin x}{\frac{\sin x}{\cos x}} \\ & \downarrow \quad \downarrow \\ & \frac{1}{\cos x} \cdot \frac{\sin x}{1} \cdot \frac{\cos x}{\sin x} \\ & = \frac{\cos x}{\cos x} = 1 \end{aligned}$$

$$\textcircled{37} 8. \frac{\cos^2 x}{1 - \sin x} = \frac{1 - \sin^2 x}{1 - \sin x}$$

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

$$= 1 + \sin x$$

$$\textcircled{51} 9. \cot^2 x - \cot^2 x \cos^2 x =$$

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

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

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

$$\textcircled{55} 10. \tan^4 x + 2 \tan^2 x + 1 =$$

$$x^4 + 2x^2 + 1$$

$$(x^2 + 1)(x^2 + 1)$$

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

$$(\sec^2 x)(\sec^2 x)$$

$$\sec^4 x$$

$$\textcircled{67} 11. \tan x - \frac{\sec^2 x}{\tan x} =$$

$$\frac{\tan x}{1} - \frac{(1 + \tan^2 x)}{\tan x}$$

$$\frac{\tan^2 x}{\tan x} - \frac{(1 + \tan^2 x)}{\tan x}$$

$$-\frac{1}{\tan x} = -\cot x$$

$$\textcircled{65} 12. \frac{1}{1 + \cos x} + \frac{1}{1 - \cos x} =$$

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

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

FOIL!