

$$1.) \cot \theta + \frac{1}{\cot \theta} = \frac{\cos \theta}{\sin \theta} + \frac{\sin \theta}{\cos \theta} = \frac{\cos^2 \theta + \sin^2 \theta}{\cos \theta \sin \theta} = \frac{1}{\cos \theta \sin \theta} = \sec(\theta) \csc(\theta)$$

$$3.) \tan(x)(\cot(x) + \csc(x)) = \frac{\sin x}{\cos x} \left(\frac{\cos x}{\sin x} + \frac{1}{\sin x} \right) = \frac{\sin x}{\cos x} \left(\frac{\cos x + 1}{\sin x} \right) = \frac{\cos x + 1}{\cos x}$$

$$35.) \text{Verify } \frac{\cot \theta}{\csc \theta} = \cos \theta$$

$$\rightarrow \frac{\frac{\cos \theta}{\sin \theta}}{\frac{1}{\sin \theta}} = \frac{\cos \theta}{\sin \theta} \cdot \sin \theta = \cos \theta \checkmark$$

$$\text{Verify } 37.) \frac{1 - \sin^2 \beta}{\cos \beta} = \cos \beta$$

$$\rightarrow \frac{\cos^2 \beta}{\cos \beta} = \cos \beta \checkmark$$

$$41.) \text{Verify } \cot(A) + \tan(A) = \sec(A) \csc(A)$$

$$\cot(A) + \tan(A) = \frac{\cos(A)}{\sin(A)} + \frac{\sin(A)}{\cos(A)} = \frac{\cos^2(A) + \sin^2(A)}{\cos(A)\sin(A)} = \frac{1}{\cos(A)\sin(A)} = \sec(A) \csc(A) \checkmark$$

$$43.) \text{Verify } \frac{\cos \alpha}{\sec \alpha} + \frac{\sin \alpha}{\csc \alpha} = \sec^2 \alpha - \tan^2 \alpha$$

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

$$= 1$$

$$\begin{aligned} &= \frac{1}{\cos^2 \alpha} - \frac{\sin^2 \alpha}{\cos^2 \alpha} \\ &= \frac{1 - \sin^2 \alpha}{\cos^2 \alpha} \\ &= \frac{\cos^2 \alpha}{\cos^2 \alpha} \\ &= 1 \end{aligned}$$

$$\text{Verify } 39.) \cos^2(\theta)(\tan^2 \theta + 1) = 1$$

$$\rightarrow (\cos^2 \theta)(\sec^2 \theta) = (\cos^2 \theta) \left(\frac{1}{\cos^2 \theta} \right) = 1 \checkmark$$

$$\begin{aligned} 45.) \sin^4 \theta - \cos^4 \theta &= 2\sin^2 \theta - 1 \\ &= (\sin^2 \theta)^2 - (\cos^2 \theta)^2 \\ &= (\sin^2 \theta - \cos^2 \theta)(\sin^2 \theta + \cos^2 \theta) \\ &= (\sin^2 \theta - \cos^2 \theta)(1) \\ &= \sin^2 \theta - \cos^2 \theta \end{aligned}$$

4/5
3/4
1/2