

$$\begin{aligned} \sin \theta &= -\frac{1}{5} & \csc \theta &= -5 \\ \cos \theta &= -\frac{2\sqrt{6}}{5} & \sec \theta &= \frac{5\sqrt{6}}{12} \\ \tan \theta &= \frac{\sqrt{6}}{12} & \cot \theta &= 2\sqrt{6} \end{aligned}$$

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

$$\left(-\frac{1}{5}\right)^2 + \cos^2 \theta = 1$$

$$\frac{1}{25} + \cos^2 \theta = 1$$

$$\cos^2 \theta = \frac{24}{25} \Rightarrow \frac{2\sqrt{6}}{5}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{-\frac{1}{5}}{\frac{2\sqrt{6}}{5}} = \frac{1}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} \Rightarrow \frac{\sqrt{6}}{12}$$

$$\frac{2\sqrt{6}}{5} \cdot \frac{\sqrt{6}}{\sqrt{6}}$$

$$\frac{5\sqrt{6}}{2\sqrt{6}\sqrt{6}} = \frac{5\sqrt{6}}{12}$$

$$\#3^2 \quad \frac{\csc x}{\sec x} = \frac{\frac{1}{\sin x}}{\frac{1}{\cos x}} \Rightarrow \frac{1}{\sin x} \cdot \frac{\cos x}{1} \Rightarrow \cot x$$

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$$\#29 \quad \sin \phi (\csc \phi - \sin \phi)$$

$$\sin \phi \csc \phi - \sin^2 \phi$$

$$1 - \sin^2 \phi$$

$$\cos^2 \phi$$

$$2(x-2)$$

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

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

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

## Techniques

1. Substitution
2. Identities  
p. 222, 152
3. Definitions
4. Properties
5. Common Den.
6. Change to  
sin & cos

$$\sin x + \cot x \cos x$$

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

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

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

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

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

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

$$\frac{\cancel{1+\cos\theta}}{\cancel{1+\cos\theta}(\sin\theta)}$$

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