

Warm-up #5: Simplifying

1. $(\csc\theta + \cot\theta)(1 - \cos\theta)$

$$\csc\theta = \csc\theta \cos\theta + \cot\theta - \cot\theta \cos\theta$$

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

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

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

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

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

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

2. $\frac{1 + \csc\theta}{\sec\theta}$ ← separate into 2 ratios

$$\frac{1}{\sec\theta} + \frac{\csc\theta}{\sec\theta}$$

$$\cos\theta + \frac{1/\sin\theta}{1/\cos\theta}$$

$$\cos\theta + \frac{1}{\sin\theta} \cdot \frac{\cos\theta}{1}$$

$$\boxed{\cos\theta + \cot\theta}$$