

324: 1, 3, 4, 7, 8, 15, 16, 66-68

$$\begin{aligned} 1. \quad & (\sec^2 \theta - 1) \cos^2 \theta = \sin^2 \theta \\ & \tan^2 \theta \cos^2 \theta = \sin^2 \theta \\ & \frac{\sin^2 \theta \cancel{\cos^2 \theta}}{\cancel{\cos^2 \theta}} = \sin^2 \theta \quad \checkmark \end{aligned}$$

$\tan + 1 = \sec$
Pythagorean Id
 $\Delta \sin \& \cos$

$$\begin{aligned} 3. \quad & \frac{\sin \theta - \sin \theta \cos^2 \theta}{\sin \theta (1 - \cos^2 \theta)} = \sin^3 \theta \\ & \frac{\sin \theta (\sin^2 \theta)}{\sin \theta (\sin^2 \theta)} = \sin^3 \theta \quad \checkmark \end{aligned}$$

factor $\sin \theta$
Pythagorean Id

$$\begin{aligned} 4. \quad & \csc \theta - \cos \theta \cot \theta = \sin \theta \\ & \left(\frac{1}{\sin \theta} \right) - \cos \theta \left(\frac{\cos \theta}{\sin \theta} \right) = \end{aligned}$$

$\Delta \sin \& \cos$
combine fraction

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

Pythagorean Id

$$\frac{\sin^2 \theta}{\sin \theta} = \underline{\sin \theta} = \underline{\sin \theta} \quad \checkmark$$

$$7. \quad \frac{\sec \theta}{\sin \theta} - \frac{\sin \theta}{\cos \theta} = \cot \theta$$

combine frac

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

$\Delta \sin \cos$

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

Pythagorean Id

$$\frac{\cancel{\cos \theta}}{\sin \theta \cancel{\cos \theta}} = \frac{\cos \theta}{\sin \theta} = \cot \theta = \cot \theta \quad \checkmark$$

$$8. \frac{\sin \theta}{1 - \cos \theta} + \frac{1 - \cos \theta}{\sin \theta} = 2 \csc \theta$$

combine fractions

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

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

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

factor out 2

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

divide $(1 - \cos \theta)$

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

$$2 \csc \theta = 2 \csc \theta \checkmark$$

$$15. \frac{1}{1 - \sin \theta} + \frac{1}{1 + \sin \theta} = 2 \sec^2 \theta$$

combine frac.

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

pythagorean ID

$$\frac{2}{\cos^2 \theta} = 2 \sec^2 \theta = 2 \sec^2 \theta \checkmark$$

$$16. \frac{\cos \theta}{1 + \sin \theta} + \frac{\cos \theta}{1 - \sin \theta} = 2 \sec \theta$$

combine fractions

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

factor $\cos \theta$
 pythagorean ID

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

$\frac{AB+AC}{A(B+C)}$ simplify

$$\frac{2}{\cos \theta} = 2 \sec \theta = 2 \sec \theta \checkmark$$

$$66. \cos \theta \operatorname{csc} \theta$$

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

$$67. \frac{\tan \theta \cot \theta}{\left(\frac{\sin \theta}{\cos \theta}\right) \left(\frac{\cos \theta}{\sin \theta}\right)} = 1$$

$$68. \frac{\sin \theta \cot \theta}{\sin \theta \left(\frac{\cos \theta}{\sin \theta}\right)} = \cos \theta$$