

Precalculus
5.2 Practice

Name:
Period:

$$\frac{\sec x - 1}{\sec x + 1} = \frac{\tan^2 x}{\cos x} = \frac{1 - \cos x}{\cos x}$$

$$\frac{\tan^2 x (\sec x - 1)}{1 - \sec^2 x} = \sec x - 1 = \frac{1}{\cos} - 1 \cdot \frac{\cos}{\cos} = \frac{1 - \cos x}{\cos x}$$

28. $\frac{\cot v - 1}{\cot v + 1} = \frac{1 - \tan v}{1 + \tan v}$

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

29. $\cot^2 x - \cos^2 x = \cos^2 x \cot^2 x$

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

30. $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$

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

31. $\cos^4 x - \sin^4 x = \cos^2 x - \sin^2 x$

$$(\cos^2 - \sin^2)(\cos^2 + \sin^2)$$

$$\cos^2 x - \sin^2 x$$

$$32. \tan^4 t + \tan^2 t = \sec^4 t - \sec^2 t$$

$$\begin{aligned} & \tan^2 (\tan^2 + 1) \\ & \downarrow \qquad \qquad \downarrow \\ & (\sec^2 - 1) (\sec^2 t) \Rightarrow \boxed{\sec^4 t - \sec^2 t} \end{aligned}$$

$$33. (x \sin \alpha + y \cos \alpha)^2 + (x \cos \alpha - y \sin \alpha)^2 = x^2 + y^2$$

$$\begin{aligned} & (x^2 \sin^2 \alpha + 2xy \sin \alpha \cos \alpha + y^2 \cos^2 \alpha) \\ & (x^2 \cos^2 \alpha - 2xy \sin \alpha \cos \alpha + y^2 \sin^2 \alpha) \\ & x^2 (\sin^2 \alpha + \cos^2 \alpha) + y^2 (\cos^2 \alpha + \sin^2 \alpha) \Rightarrow x^2 + y^2 \checkmark \end{aligned}$$

$$34. \frac{1 - \cos \theta}{\sin \theta} = \frac{\sin \theta}{1 + \cos \theta} \frac{(1 - \cos \theta)}{(1 - \cos \theta)}$$

$$\begin{aligned} & \frac{\sin(1 - \cos \theta)}{1 - \cos^2 \theta} \Rightarrow \frac{1 - \cos \theta}{\sin \theta} \checkmark \\ & \frac{\sin \theta (1 - \cos \theta)}{\sin^2 \theta} \end{aligned}$$

$$35. \frac{\tan x}{\sec x - 1} = \frac{\sec x + 1}{\tan x}$$

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

$$36. \frac{\sin t}{1 + \cos t} + \frac{1 + \cos t}{\sin t} = \frac{1 + \cos t}{\sin t}$$

$$\frac{\sin^2 t + 1 + 2 \cos t + \cos^2 t}{(1 + \cos t) \sin t} = \frac{2 + 2 \cos t}{(1 + \cos t) \sin t} \Rightarrow \frac{2(1 + \cos t)}{(1 + \cos t) \sin t}$$

$$\Rightarrow \boxed{2 \csc t}$$