

11/2

warm-up

1. $\tan \theta = \frac{2}{9}$, $\cot \theta = \left(\frac{9}{2}\right)$

2. $\sin \theta = \frac{4}{5}$, $\cos \theta = \frac{3}{5}$, $\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\frac{4}{5}}{\frac{3}{5}} = \frac{4}{5} \cdot \frac{5}{3} = \left(\frac{4}{3}\right)$

3. $\csc \theta = 3$

$\cot^2 \theta + 1 = \csc^2 \theta$

$\cot^2 \theta + 1 = 9$

$\cot^2 \theta = 8$

$\cot \theta = 2\sqrt{2}$

$\tan \theta = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4}$

$\tan^2 \theta + 1 = \sec^2 \theta$

$\frac{2}{16} + 1 = \sec^2 \theta$

$\frac{18}{16} = \sec^2 \theta$

$\frac{\sqrt{18}}{4} = \sec \theta$

$\frac{3\sqrt{2}}{4} = \sec \theta$

$\cos \theta = \frac{4}{3\sqrt{2}} = \frac{-4\sqrt{2}}{6} = \left(\frac{-2\sqrt{2}}{3}\right)$

4. $\csc x - \csc x \cos^2 x$

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

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

5. $\sin \theta = 0.59$, $\cos\left(\theta - \frac{\pi}{2}\right)$

$\cos\left[-\left(\frac{\pi}{2} - \theta\right)\right]$

$\cos\left(\frac{\pi}{2} - \theta\right)$

$\sin(\theta)$

0.59

(c)

$$\frac{\sec x}{(1+\sec x)(1-\sec x)} - \frac{\sec x}{1+\sec x} \cdot \frac{(1-\sec x)}{(1-\sec x)}$$

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

$$\frac{2 \sec^2 x}{1 - \sec^2 x}$$

$$\frac{2 \sec^2 x}{-\tan^2 \theta}$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

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

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

$$1 + \tan^2 x = \sec^2 x$$

$$\frac{1 + \tan^2 x}{\csc^2 x} = \frac{\sec^2 x}{\csc^2 x} = \frac{\frac{1}{\cos^2 x}}{\frac{1}{\sin^2 x}} = \frac{1}{\cos^2 x} \cdot \frac{\sin^2 x}{1} = \tan^2 x$$