

$$27. \sin x + \cos x \stackrel{?}{=} \frac{\cos x}{1 - \tan x} + \frac{\sin x}{1 - \cot x}$$

$$\sin x + \cos x \stackrel{?}{=} \frac{\cos x}{1 - \frac{\sin x}{\cos x}} + \frac{\sin x}{1 - \frac{\cos x}{\sin x}}$$

$$\sin x + \cos x \stackrel{?}{=} \frac{\cos x}{1 - \frac{\sin x}{\cos x}} \cdot \frac{\cos x}{\cos x} + \frac{\sin x}{1 - \frac{\cos x}{\sin x}} \cdot \frac{\sin x}{\sin x}$$

$$\sin x + \cos x \stackrel{?}{=} \frac{\cos^2 x}{\cos x - \sin x} + \frac{\sin^2 x}{\sin x - \cos x}$$

$$\sin x + \cos x \stackrel{?}{=} -\frac{\cos^2 x}{\sin x - \cos x} + \frac{\sin^2 x}{\sin x - \cos x}$$

$$\sin x + \cos x \stackrel{?}{=} \frac{\sin^2 x - \cos^2 x}{\sin x - \cos x}$$

$$\sin x + \cos x \stackrel{?}{=} \frac{(\sin x + \cos x)(\sin x - \cos x)}{\sin x - \cos x}$$

$$\sin x + \cos x = \sin x + \cos x$$

$$28. \sin \theta + \cos \theta + \tan \theta \sin \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \cos \theta + \frac{\sin \theta}{\cos \theta} \sin \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \cos \theta + \frac{\sin^2 \theta}{\cos \theta} \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \frac{\cos^2 \theta}{\cos \theta} + \frac{\sin^2 \theta}{\cos \theta} \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \frac{\cos^2 \theta + \sin^2 \theta}{\cos \theta} \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \frac{1}{\cos \theta} \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta + \sec \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sin \theta \frac{\cos \theta}{\cos \theta} + \sec \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\cos \theta \frac{\sin \theta}{\cos \theta} + \sec \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\cos \theta \tan \theta + \sec \theta \stackrel{?}{=} \sec \theta + \cos \theta \tan \theta$$

$$\sec \theta + \cos \theta \tan \theta = \sec \theta + \cos \theta \tan \theta$$

$$29. \text{Sample answer: } \sec x = \sqrt{2}$$

$$\frac{\csc x}{\cot x} = \sqrt{2}$$

$$\frac{1}{\frac{\sin \theta}{\cos \theta}} = \sqrt{2}$$

$$\frac{1}{\cos x} = \sqrt{2}$$

$$\sec x = \sqrt{2}$$

$$30. \text{Sample answer: } \tan x = 2$$

$$\frac{1 + \tan x}{1 + \cot x} = 2$$

$$1 + \frac{\sin x}{\cos x} = 2$$

$$1 + \frac{\cos x}{\sin x} = 2$$

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

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

$$\frac{\sin x}{\cos x} = 2$$

$$\tan x = 2$$

$$31. \text{Sample answer: } \cos x = 0$$

$$\frac{1}{\cot x} - \frac{\sec x}{\csc x} = \cos x$$

$$\tan x - \frac{\cos x}{\frac{1}{\sin x}} = \cos x$$

$$\tan x - \frac{\sin x}{\cos x} = \cos x$$

$$\tan x - \tan x = \cos x$$

$$0 = \cos x$$

$$32. \text{Sample answer: } \sin x = \frac{1}{2}$$

$$\frac{1 + \cos x}{\sin x} + \frac{\sin x}{1 + \cos x} = 4$$

$$\frac{1 + 2 \cos x + \cos^2 x}{\sin x(1 + \cos x)} + \frac{\sin^2 x}{\sin x(1 + \cos x)} = 4$$

$$\frac{1 + 2 \cos x + \cos^2 x + \sin^2 x}{\sin x(1 + \cos x)} = 4$$

$$\frac{2 + 2 \cos x}{\sin x(1 + \cos x)} = 4$$

$$\frac{2(1 + \cos x)}{\sin x(1 + \cos x)} = 4$$

$$\frac{2}{\sin x} = 4$$

$$2 = 4 \sin x$$

$$\frac{1}{2} = \sin x$$

$$33. \text{Sample answer: } \sin x = 1$$

$$\cos^2 x + 2 \sin x - 2 = 0$$

$$1 - \sin^2 x + 2 \sin x - 2 = 0$$

$$0 = \sin^2 x - 2 \sin x + 1$$

$$0 = (\sin x - 1)^2$$

$$0 = \sin x - 1$$

$$\sin x = 1$$

$$34. \text{Sample answer: } \cot x = 1$$

$$\csc x = \sin x \tan x + \cos x$$

$$\csc x = \sin x \frac{\sin x}{\cos x} + \cos x$$

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

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

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

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

$$\cot x = 1$$

$$35. \frac{\tan^3 \theta - 1}{\tan \theta - 1} - \sec^2 \theta - 1 = 0$$

$$\frac{(\tan \theta - 1)(\tan^2 \theta + \tan \theta + 1)}{\tan \theta - 1} - (\tan^2 \theta + 1) - 1 = 0$$

$$\tan^2 \theta + \tan \theta + 1 - \tan^2 \theta - 1 - 1 = 0$$

$$\tan \theta - 1 = 0$$

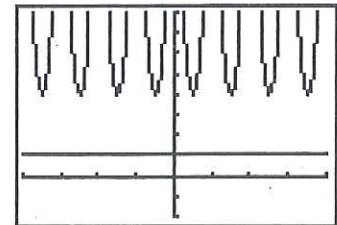
$$\tan \theta = 1$$

$$\cot \theta = \frac{1}{\tan \theta}$$

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

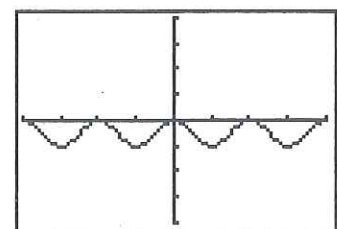
$$\cot \theta = 1$$

36. no



$$[-2\pi, 2\pi] \text{ scl: } \frac{\pi}{2} \text{ by } [-2, 8] \text{ scl: } 1$$

37. yes



$$[-2\pi, 2\pi] \text{ scl: } \frac{\pi}{2} \text{ by } [-4, 4] \text{ scl: } 1$$