

Name KEY

Questions 1-10: True or False?

✓ 1.  $\sin \theta + \cos \theta = 1$  false

✓ 2.  $\tan^2 \theta + \sec^2 \theta = 1$  false

✓ 3.  $\sin(-\theta) = -\sin \theta$  true

✓ 4.  $\cos(-\theta) = -\cos \theta$  false

✓ 5.  $\tan(-\theta) = -\tan \theta$  true

✓ 6.  $\cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$  true

✓ 7.  $\cos \theta = \frac{1}{\csc \theta}$  false

✓ 8.  $\tan^2 \theta + 1 = \sec^2 \theta$  true

✓ 9.  $\sin^2 \theta + \cos^2 \theta = 1$  true

✓ 10.  $\csc\left(\frac{\pi}{2} - \theta\right) = \sin \theta$  false

Use trigonometric identities to transform one side of the equation into the other.

✓ 11.  $(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$

$$\sec^2 \theta - \tan^2 \theta =$$

$$1 =$$

b/c  $\tan^2 x + 1 = \sec^2 x$

becomes

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

✓ 12.  $\csc \theta \tan \theta = \sec \theta$

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

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

$$\sec \theta =$$

✓ 13.  $\cot^2 \theta = \frac{1}{\sin^2 \theta} - 1$

$$= \csc^2 \theta - 1$$

$$= \cot^2 \theta$$

b/c

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

becomes

$$\csc^2 x - 1 = \cot^2 \theta$$

✓ 14.  $\frac{\tan^2 x + 1}{\tan^2 x} = \csc^2 x$

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

$$1 + \cot^2 x =$$

$$\csc^2 x =$$

$$\checkmark 15. \frac{\csc x}{\sin x} - \frac{\cot x}{\tan x} = 1$$

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

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

$$\csc^2 x - \cot^2 x =$$

$$1 =$$

b/c  $\cot^2 x + 1 = \csc^2 x$

becomes  $1 = \csc^2 x - \cot^2 x$

$$\checkmark 16. \sec x \csc^2 x - \csc^2 x = \frac{\sec x}{1 + \cos x} \cdot \frac{1 - \cos x}{1 - \cos x}$$

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

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

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

$$= (\sec x - 1) \csc^2 x$$

$$= \sec x \csc^2 x - \csc^2 x$$

$$\checkmark 17. \tan^2 x \cos^2 x + \cot^2 x \sin^2 x = 1$$

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

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

$$1 =$$

$$\checkmark 18. \frac{1 + \tan x}{\sin x} - \sec x = \csc x$$

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

$$\csc x + \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x} - \sec x =$$

$$\csc x + \sec x - \sec x =$$

$$\csc x =$$

$$\checkmark 19. \frac{\cot x}{\sec x} = \csc x - \sin x$$

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

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

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

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

$$= \cot x \cdot \frac{1}{\sec x} = \frac{\cot x}{\sec x}$$

$$\checkmark 20. \tan x + \cot x = \csc x \sec x$$

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

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

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

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

$$\frac{1}{\sin x} \cdot \frac{1}{\cos x} = \csc x \sec x$$

$$\checkmark 21. \frac{\tan x + \cos x}{\sin x} = \sec x + \cot x$$

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

$$\frac{\sin x}{\cos x} \div \sin x + \cot x$$

$$\frac{\cancel{\sin x}}{\cos x} \cdot \frac{1}{\cancel{\sin x}} + \cot x =$$

$$\frac{1}{\cos x} + \cot x =$$

$$\sec x + \cot x =$$

$$\checkmark 22. \frac{\cos x}{\sec x} + \frac{\sin x}{\csc x} = \sec^2 x - \tan^2 x$$

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

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

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

$$1 =$$

$$\sec^2 x - \tan^2 x =$$

$$\text{b/c } \tan^2 x + 1 = \sec^2 x$$

$$\text{becomes } \sec^2 x - \tan^2 x = 1$$