

## Assignment

Date \_\_\_\_\_ Period \_\_\_\_\_

**Verify each identity.**

1)  $\cos^2 x \tan x \sec x = \sin x$

2)  $\csc x \cos x = \cot x$

3)  $\frac{\sin x}{\cos^2 x} = \frac{\sec x}{\cot x}$

4)  $\sec^2 x - 1 = \frac{\tan x}{\cot x}$

5)  $\frac{\tan x}{\csc x} = \frac{\sin x}{\cot x}$

$$6) \sec^2 x + \cot^2 x = \csc^2 x + \tan^2 x$$

$$7) \sec x \cot^2 x = \frac{\cos x}{\sin^2 x}$$

$$8) \frac{\csc x + 1}{\csc x} = 1 + \sin x$$

$$9) \frac{\cos x + \sec x}{\sec x} = 1 + \cos^2 x$$

$$10) \csc x - \cot x = \frac{1 - \cos x}{\sin x}$$

$$11) \sec^2 x \sin^2 x = \sec^2 x - 1$$

$$12) \frac{1}{1 + \cot^2 x} = \frac{\cos^2 x}{\cot^2 x}$$

$$13) -\cos^2 x \csc^2 x = 1 - \csc^2 x$$

$$14) \frac{\tan^2 x}{\sin^2 x} = 1 + \tan^2 x$$

$$15) \frac{\cot^2 x}{\cos^2 x \sec^2 x} = \csc^2 x - 1$$

$$16) \frac{\cot^2 x}{\csc^2 x + \sec^2 x} = \cos^4 x$$

$$17) \frac{\cot^2 x}{\cos^2 x} = 1 + \cot^2 x$$

$$18) \cos^2 x(1 + \cot^2 x) = \frac{\csc x}{\sec x \tan x}$$

$$19) \frac{1 + \cot^2 x}{\sec x} = \frac{\cot x}{\sin x}$$

$$20) \cot^2 x \sec^2 x = \cot^2 x + 1$$

## Assignment

Date \_\_\_\_\_ Period \_\_\_\_\_

Verify each identity.

1)  $\cos^2 x \tan x \sec x = \sin x$

$$\cos^2 x \tan x \sec x \quad \text{Decompose into sine and cosine}$$

$$\cos^2 x \cdot \frac{\sin x}{\cos x} \cdot \frac{1}{\cos x} \quad \text{Simplify}$$

$$\sin x \quad \blacksquare$$

2)  $\csc x \cos x = \cot x$

$$\csc x \cos x \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\frac{\cos x}{\sin x} \quad \text{Use } \cot x = \frac{\cos x}{\sin x}$$

$$\cot x \quad \blacksquare$$

3)  $\frac{\sin x}{\cos^2 x} = \frac{\sec x}{\cot x}$

$$\frac{\sin x}{\cos^2 x} \quad \text{Use } \cot x = \frac{\cos x}{\sin x}$$

$$\frac{1}{\cot x \cos x} \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\frac{\sec x}{\cot x} \quad \blacksquare$$

4)  $\sec^2 x - 1 = \frac{\tan x}{\cot x}$

$$\sec^2 x - 1 \quad \text{Use } \tan^2 x + 1 = \sec^2 x$$

$$\tan^2 x \quad \text{Use } \cot x = \frac{1}{\tan x}$$

$$\frac{\tan x}{\cot x} \quad \blacksquare$$

5)  $\frac{\tan x}{\csc x} = \frac{\sin x}{\cot x}$

$$\frac{\tan x}{\csc x} \quad \text{Use } \cot x = \frac{1}{\tan x}$$

$$\frac{1}{\csc x \cot x} \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\frac{\sin x}{\cot x} \quad \blacksquare$$

$$6) \sec^2 x + \cot^2 x = \csc^2 x + \tan^2 x$$

$$\sec^2 x + \cot^2 x \quad \text{Use } \tan^2 x + 1 = \sec^2 x$$

$$\tan^2 x + 1 + \cot^2 x \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$\csc^2 x + \tan^2 x \quad \blacksquare$$

$$7) \sec x \cot^2 x = \frac{\cos x}{\sin^2 x}$$

$$\sec x \cot^2 x \quad \text{Decompose into sine and cosine}$$

$$\frac{1}{\cos x} \cdot \left(\frac{\cos x}{\sin x}\right)^2 \quad \text{Simplify}$$

$$\frac{\cos x}{\sin^2 x} \quad \blacksquare$$

$$8) \frac{\csc x + 1}{\csc x} = 1 + \sin x$$

$$\frac{\csc x + 1}{\csc x} \quad \text{Decompose into sine and cosine}$$

$$\frac{\frac{1}{\sin x} + 1}{\frac{1}{\sin x}} \quad \text{Simplify}$$

$$1 + \sin x \quad \blacksquare$$



$$9) \frac{\cos x + \sec x}{\sec x} = 1 + \cos^2 x$$

$$\frac{\cos x + \sec x}{\sec x} \quad \text{Decompose into sine and cosine}$$

$$\frac{\cos x + \frac{1}{\cos x}}{\frac{1}{\cos x}} \quad \text{Simplify}$$

$$1 + \cos^2 x \quad \blacksquare$$

$$10) \csc x - \cot x = \frac{1 - \cos x}{\sin x}$$

$$\csc x - \cot x \quad \text{Decompose into sine and cosine}$$

$$\frac{1}{\sin x} - \frac{\cos x}{\sin x} \quad \text{Simplify}$$

$$\frac{1 - \cos x}{\sin x} \quad \blacksquare$$

$$11) \sec^2 x \sin^2 x = \sec^2 x - 1$$

$$\sec^2 x \sin^2 x \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\frac{\sin^2 x}{\cos^2 x} \quad \text{Use } \tan x = \frac{\sin x}{\cos x}$$

$$\tan^2 x \quad \text{Use } \tan^2 x + 1 = \sec^2 x$$

$$\sec^2 x - 1 \quad \blacksquare$$

$$12) \frac{1}{1 + \cot^2 x} = \frac{\cos^2 x}{\cot^2 x}$$

$$\frac{1}{1 + \cot^2 x}$$

$$\frac{1}{\csc^2 x}$$

$$\sin^2 x$$

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

$$\frac{\cos^2 x}{\cot^2 x}$$

$$13) -\cos^2 x \csc^2 x = 1 - \csc^2 x$$

$$-\cos^2 x \csc^2 x \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$-\frac{\cos^2 x}{\sin^2 x} \quad \text{Use } \cot x = \frac{\cos x}{\sin x}$$

$$-\cot^2 x \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$1 - \csc^2 x \quad \blacksquare$$

$$15) \frac{\cot^2 x}{\cos^2 x \sec^2 x} = \csc^2 x - 1$$

$$\frac{\cot^2 x}{\cos^2 x \sec^2 x} \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\frac{\cot^2 x \cos^2 x}{\cos^2 x} \quad \text{Cancel common factors}$$

$$\cot^2 x \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$\csc^2 x - 1 \quad \blacksquare$$

$$16) \frac{\cot^2 x}{\csc^2 x + \sec^2 x} = \cos^4 x$$

$$14) \frac{\tan^2 x}{\sin^2 x} = 1 + \tan^2 x$$

$$\frac{\tan^2 x}{\sin^2 x} \quad \text{Use } \tan x = \frac{\sin x}{\cos x}$$

$$\frac{\sin^2 x}{\sin^2 x \cos^2 x} \quad \text{Cancel common factors}$$

$$\frac{1}{\cos^2 x} \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\sec^2 x \quad \text{Use } \tan^2 x + 1 = \sec^2 x$$

$$1 + \tan^2 x \quad \blacksquare$$

$$\frac{\cot^2 x}{\csc^2 x + \sec^2 x} \quad \text{Decompose into sine and cosine}$$

$$\frac{\left(\frac{\cos x}{\sin x}\right)^2}{\left(\frac{1}{\sin x}\right)^2 + \left(\frac{1}{\cos x}\right)^2} \quad \text{Simplify}$$

$$\frac{\cos^4 x}{\cos^2 x + \sin^2 x} \quad \text{Use } \sin^2 x + \cos^2 x = 1$$

$$\cos^4 x \quad \blacksquare$$

$$17) \frac{\cot^2 x}{\cos^2 x} = 1 + \cot^2 x$$

$$\frac{\cot^2 x}{\cos^2 x} \quad \text{Use } \cot x = \frac{\cos x}{\sin x}$$

$$\frac{\cos^2 x}{\cos^2 x \sin^2 x} \quad \text{Cancel common factors}$$

$$\frac{1}{\sin^2 x} \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\csc^2 x \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$1 + \cot^2 x \quad \blacksquare$$

$$18) \cos^2 x(1 + \cot^2 x) = \frac{\csc x}{\sec x \tan x}$$

$$\cos^2 x(1 + \cot^2 x) \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$\cos^2 x \csc^2 x \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\frac{\cos^2 x \csc x}{\sin x} \quad \text{Use } \tan x = \frac{\sin x}{\cos x}$$

$$\frac{\csc x \cos x}{\tan x} \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\frac{\csc x}{\sec x \tan x} \quad \blacksquare$$

$$19) \frac{1 + \cot^2 x}{\sec x} = \frac{\cot x}{\sin x}$$

$$\frac{1 + \cot^2 x}{\sec x} \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$\frac{\csc^2 x}{\sec x} \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\frac{1}{\sin^2 x \sec x} \quad \text{Use } \sec x = \frac{1}{\cos x}$$

$$\frac{\cos x}{\sin^2 x} \quad \text{Use } \cot x = \frac{\cos x}{\sin x}$$

$$\frac{\cot x}{\sin x} \quad \blacksquare$$

$$20) \cot^2 x \sec^2 x = \cot^2 x + 1$$

$$\cot^2 x \sec^2 x \quad \text{Decompose into sine and cosine}$$

$$\left(\frac{\cos x}{\sin x}\right)^2 \cdot \left(\frac{1}{\cos x}\right)^2 \quad \text{Simplify}$$

$$\frac{1}{\sin^2 x} \quad \text{Use } \csc x = \frac{1}{\sin x}$$

$$\csc^2 x \quad \text{Use } \cot^2 x + 1 = \csc^2 x$$

$$\cot^2 x + 1 \quad \blacksquare$$