

C12 - 6.1 - Ratios $cscx$ $secx$ $cotx$ HW

Simplify

$$\sin x \sec x$$

$$\cos x \cos x$$

$$\tan x \cot x$$

$$\csc x \csc x$$

$$\sin x \sin x$$

$$\cos x \sec x$$

$$\tan x \csc x$$

$$\sec x \sec x$$

$$\sin x \cos x$$

$$\cos x \csc x$$

$$\tan x \tan x$$

$$\cot x \sec x$$

$$\sin x \cot x$$

$$\cos x \tan x$$

$$\cot x \cot x$$

$$\sin x \csc x$$

$$\cos x \sin x$$

$$\tan x \sin x \cot x$$

Simplify to $\sin x$ and $\cos x$

$$\sin x \tan x$$

$$\cos x \cot x$$

$$\tan x \sec x$$

$$\csc x \cot x$$

$$\csc x \sec x$$

C12 - 6.1 - Ratios $cscx$ $secx$ $cotx$ Notes

Simplify

$$\sin^2 x cscx$$

$$csc^2 x \sin x$$

$$cscx \cos^2 x$$

$$\sec^2 x \cos x$$

$$\sin^2 x csc^2 x$$

$$\sin^2 x \cot^2 x$$

$$\cos^2 x \sec^2 x$$

$$\cos^2 x \tan^2 x$$

$$csc^2 x \sec^2 x$$

$$\tan^2 x \cot^2 x$$

$$csc^2 x \cot^2 x$$

$$\sec^2 x \tan^2 x$$

C12 - 6.1 - Ratios $cscx$ $secx$ $cotx$ HW

Simplify

$$\frac{\sin x}{\sin x}$$

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

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

$$\frac{\csc x}{\csc x}$$

$$\frac{1}{\tan x}$$

$$\frac{\cot x}{\cot x}$$

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

$$\frac{1}{\cot x}$$

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

$$\frac{\sec x}{\sec x}$$

$$\frac{\cos x}{\cos x}$$

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

$$\frac{\tan x}{\tan x}$$

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

$$\frac{1}{\sec x}$$

$$\frac{\sin x}{\tan x}$$

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

$$\frac{\cos x}{\tan x}$$

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

$$\frac{\tan x}{\sin x}$$

$$\frac{\tan x}{\cos x}$$

$$\frac{\sec x}{\cos x}$$

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

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

Try it in your head!

$$\frac{\cos x}{\sec x}$$

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

$$\frac{\tan x}{\csc x}$$

$$\frac{\sec x}{\tan x}$$

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

$$\frac{\csc x}{\tan x}$$

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

$$\frac{\csc x}{\sec x}$$

$$\frac{\csc x}{\cot x}$$

C12 - 6.1 - Ratios $cscx$ $secx$ $cotx$ HW

Simplify

$$\frac{\sin x \cot x}{\sec x}$$

$$\frac{\cos x \tan x}{\sec x}$$

$$\frac{\csc x \tan x}{\csc x}$$

$$\frac{\cot x \sec^2 x}{\csc^2 x}$$

$$\frac{\tan x \csc^2 x}{\sec^2 x}$$

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

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

C12 - 6.2 - Add Subtract Fractions WS

Simplify

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

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

$$\cot x + \csc x$$

$$\sec x + \tan x$$

$$\sin x + \csc x$$

$$\sin x + \sec x$$

$$\cos x + \sec x$$

$$\cos x + \csc x$$

$$\sin x - \sec x$$

$$\cos x - \cot x$$

$$\cos x + \sin x \tan x$$

$$\sin x + \cos x \cot x$$

C12 - 6.2 - Add Subtract Fractions Pythag WS

Simplify

$$\csc x - \cot x \cos x$$

$$\sec x - \tan x \sin x$$

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

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

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

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

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

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

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

$$\csc^2 x - \frac{\cot x}{\sin x}$$

C12 - 6.2 - Add Subtract Fractions Pythag WS

Simplify

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

$$\frac{\cos x}{1 + \cos x} + \frac{\cos x}{1 - \cos x}$$

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

$$\frac{\cos x}{1 + \cos x} - \frac{\cos x}{1 - \cos x}$$

$$\frac{1}{1 + \cos x} - \frac{1}{1 - \cos x}$$

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

C12 - 6.2 - Add Subtract Fractions Complex WS

Simplify

$$\frac{1 + \frac{1}{\sin x}}{\cot x}$$

$$\frac{1 + \frac{1}{\cos x}}{\tan x}$$

$$\frac{\sec x}{1 + \frac{1}{\cos x}}$$

$$\frac{\tan x}{1 + \frac{1}{\cos x}}$$

$$\frac{\sec x}{1 + \frac{\sin x}{\cos x}}$$

$$\frac{1 + \sin x}{1 + \csc x}$$

$$\frac{1 + \csc x}{1 + \sec x}$$

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

$$\frac{\csc x + \sec x}{\cot x + 1}$$

$$\frac{\csc x + \sec x}{\tan x + 1}$$

C12 - 6.3 - Proofs Pythag Reciprocal Fractions HW

Prove the left hand side equals the right hand side

$$\begin{array}{|c|c|} \hline \sin x \sec x & \tan x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cos x \tan x & \sin x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \sin x \csc x & 1 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cos x \csc x & \cot x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cos x \sec x & 1 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \tan x \csc x & \sec x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cot x \sec x & \csc x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \sin x \cot x & \cos x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cos x \cot x & \frac{\cos^2 x}{\sin x} \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cot x \cot x & \cot^2 x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \cos x \sin x & \sin x \cos x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \sin^2 x & \sin x \sin x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \tan x \sec x & \frac{\sin x}{\cos^2 x} \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline \tan x \cot x & 1 \\ \hline \end{array}$$

Make one up!

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array}$$

C12 - 6.3 - Proofs Pythag Reciprocal Fractions HW

Prove the left hand side equals the right hand side

$$\frac{\sin x}{\tan x} \quad | \quad \cos x$$

$$\frac{\cos x}{\sec x} \quad | \quad \cos^2 x$$

$$\frac{1}{\cos x} \quad | \quad \sec x$$

$$\frac{\tan x}{\sin x} \quad | \quad \sec x$$

$$\frac{\tan x}{\cos x} \quad | \quad \frac{\sin x}{\cos^2 x}$$

$$\frac{\sin x}{\sin x} \quad | \quad 1$$

$$\frac{\sin x}{\cot x} \quad | \quad \frac{\sin^2 x}{\cos x}$$

$$\frac{\sin x}{\cos x} \quad | \quad \tan x$$

$$\frac{\cos x}{\cot x} \quad | \quad \sin x$$

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

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

$$\frac{\csc x}{\cot x} \quad | \quad \cos x$$

C12 - 6.3 - Proofs Pythag Reciprocal Fractions HW

Prove the left hand side equals the right hand side

$$\cot x + \csc x \quad \left| \begin{array}{c} \frac{\cos x + 1}{\sin x} \\ \hline \end{array} \right.$$

$$\frac{1 + \sin x}{\cos x} \quad \left| \begin{array}{c} \sec x + \tan x \\ \hline \end{array} \right.$$

$$\sin x + \csc x \quad \left| \begin{array}{c} \frac{\sin^2 x + 1}{\sin x} \\ \hline \end{array} \right.$$

$$\sin x + \sec x \quad \left| \begin{array}{c} \frac{\sin x \cos x + 1}{\cos x} \\ \hline \end{array} \right.$$

$$2\sin x - \frac{1}{\csc x} \quad \left| \begin{array}{c} \sin x \\ \hline \end{array} \right.$$

$$\sec x - \tan x \sin x \quad \left| \begin{array}{c} \cos x \\ \hline \end{array} \right.$$

C12 - 6.3 - Proofs Pythag Reciprocal Fractions HW

Prove the left hand side equals the right hand side

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

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

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

$$\frac{\csc^2 x - \frac{\cot x}{\sin x}}{\frac{1}{1 + \cos x}}$$

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

$$\frac{\cot^2 x}{\frac{\cos^2 x}{1 - \cos^2 x}}$$

C12 - 6.3 - Proofs Pythag Reciprocal Fractions HW

Prove the left hand side equals the right hand side

$$\frac{1}{\sec^2 x} \quad | \quad \sin^2 x$$

$$\frac{1}{\cos^2 x} \quad | \quad -\tan^2 x$$

$$\frac{1}{\tan^2 x} \quad | \quad \csc^2 x$$

$$\frac{1}{\csc^2 x} \quad | \quad 1 + \cos^2 x$$

$$\csc x \cos^2 x + \sin x \quad | \quad \csc x$$

$$\sec x \sin^2 x + \cos x \quad | \quad \sec x$$

C12 - 6.3 - Proofs Add Subtract Foil Factor Pythag WS

Prove the left hand side equals the right hand side

$$\frac{(\csc x + \cot x)(\csc x - \cot x)}{\sin^2 x} \quad | \quad \csc^2 x$$

$$\frac{\cos x}{1 + \sin x} + \frac{1 + \sin x}{\cos x} \quad | \quad 2 \sec x$$

$$\frac{1}{1 - \cos x} + \frac{1}{1 + \cos x} \quad | \quad 2 \csc^2 x$$

$$\frac{\cos x}{1 - \cos x} - \frac{\cos x}{1 + \cos x} \quad | \quad 2 \cot^2 x$$

$$\frac{1}{1 - \cos x} - \frac{1}{1 + \cos x} \quad | \quad 2 \cot x \csc x$$

$$(sin x - cos x)^2 \quad | \quad 1 - 2 \sin x \cos x$$

C12 - 6.3 - Proofs Add Subtract Foil Factor Pythag WS

Prove the left hand side equals the right hand side

$$\begin{array}{c|c} \cos x - \cot x & \cot x(\sin x - 1) \\ \hline & \end{array}$$
$$\begin{array}{c|c} \sec x \sin^2 x + \cos x & \sec x \\ \hline & \end{array}$$

$$\begin{array}{c|c} 3 - \sin^2 x & 2 + \cos^2 x \\ \hline & \end{array}$$
$$\begin{array}{c|c} \sin x - \csc x & \frac{-\cos^2 x}{\sin x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} 1 + \frac{\sin^2 x}{\cos^2 x} & \sec^2 x \\ \hline & \end{array}$$
$$\begin{array}{c|c} \frac{1 + \sin x}{1 + \csc x} & \frac{\sin x}{1 - \sin x} \\ \hline & \end{array}$$

C12 - 6.3 - Proofs Add Subtract Comp Frac Pythag WS

Prove the left hand side equals the right hand side

$$\begin{array}{c|c} \frac{\cos x + 1}{\sin x} & \frac{1 + \frac{1}{\cos x}}{\tan x} \\ \hline \end{array}$$

$$\begin{array}{c|c} \frac{1 + \frac{1}{\sin x}}{\cot x} & \frac{1 + \sin x}{\cos x} \\ \hline \end{array}$$

$$\begin{array}{c|c} \frac{\csc x}{1 + \frac{1}{\sin x}} & \frac{1}{1 + \sin x} \\ \hline \end{array}$$

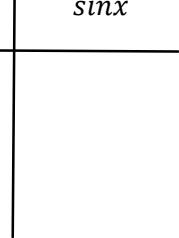
$$\begin{array}{c|c} \frac{\cos x}{1 + \sin x} & \frac{\cot x}{1 + \frac{1}{\sin x}} \\ \hline \end{array}$$

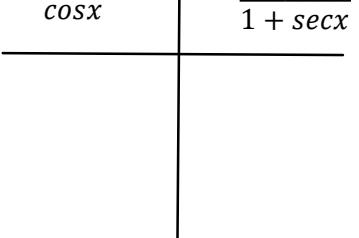
$$\begin{array}{c|c} \frac{\csc x}{1 + \frac{\cos x}{\sin x}} & \frac{1}{\sin x + \cos x} \\ \hline \end{array}$$

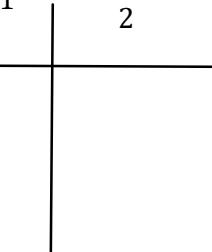
$$\begin{array}{c|c} \frac{1}{1 + \tan x} & \frac{\cos x}{\sin x + \cos x} \\ \hline \end{array}$$

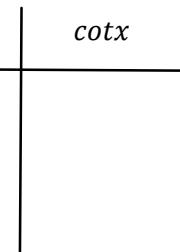
C12 - 6.3 - Proofs Add Subtract Comp Frac Pythag WS

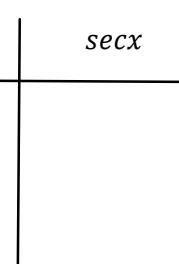
Prove the left hand side equals the right hand side

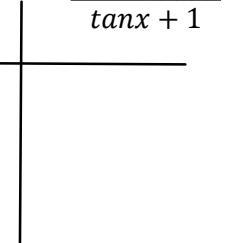
$$\frac{1 + \sin x}{1 + \csc x} \quad | \quad \sin x$$


$$\cos x \quad | \quad \frac{1 + \cos x}{1 + \sec x}$$


$$\frac{1 + \sec x}{1 + \csc x} + 1 \quad | \quad 2$$


$$\frac{1 + \cot x}{1 + \tan x} \quad | \quad \cot x$$


$$\frac{\csc x + \sec x}{\cot x + 1} \quad | \quad \sec x$$


$$\csc x \quad | \quad \frac{\csc x + \sec x}{\tan x + 1}$$


C12 - 6.4 - Proofs Conjugate HW

$$\begin{array}{c|c} \frac{\sin x}{1 + \cos x} & \frac{1 - \cos x}{\sin x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} \frac{\cos x}{1 - \sin x} & \frac{1 + \sin x}{\cos x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} \frac{\sin x}{1 - \cos x} & \frac{1 + \cos x}{\sin x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} \frac{\cos x}{1 + \sin x} & \frac{1 - \sin x}{\cos x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} \sec x + \tan x & \frac{\cos x}{1 - \sin x} \\ \hline & \end{array}$$

$$\begin{array}{c|c} & \\ \hline & \end{array}$$

C12 - 6.4 - FOIL Factor WS (See 4.5 Notes)

Distribute/Foil

$$\sin x(1 - \sin x)$$

$$\cos x(\sin x + 1)$$

$$(1 + \cos x)(1 - \cos x)$$

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

$$(\sin x + 2)(\sin x - 1)$$

$$(\cos x + 1)(\cos x - 3)$$

Factor

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

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

$$\cos x + \cos^2 x$$

$$1 - \sin^2 x$$

$$1 + \sin^2 x$$

$$\sin^3 x - \sin x$$

$$\cos^2 x + \cos x - 2$$

$$\cos^3 x + \cos^2 x - 2\cos x$$

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

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

$$\csc x^2 - 2\csc x - 3$$

$$2\sin x - \frac{1}{\sin x} + 1$$

C12 - 6.4 - Proofs FOIL Factor Pythag WS (See 4.5 Notes)

Prove the left hand side equals the right hand side

$$\begin{array}{c|c} (\sin x - 2)(\sin x + 1) & \sin^2 x - \sin x - 2 \\ \hline & \end{array} \quad \begin{array}{c|c} (1 + \sin x)(1 - \sin x) & \cos^2 x \\ \hline & \end{array}$$

$$\begin{array}{c|c} (1 + \cos x)(1 - \cos x) & \sin^2 x \\ \hline & \end{array} \quad \begin{array}{c|c} (2\cos x - 1)(\cos x + 2) & 2\cos^2 x + 3\cos x - 2 \\ \hline & \end{array}$$

Make up two!

$$\begin{array}{c|c} & \end{array} \quad \begin{array}{c|c} & \end{array}$$

C12 - 6.5 - Expand Sum Difference WS

Expand:

$$\sin(x + \frac{\pi}{3})$$

$$\sin(x - \pi)$$

$$\cos(x + \frac{\pi}{6})$$

$$\cos(x + \frac{\pi}{4})$$

Find the exact value of the following:

$$\cos 15^\circ =$$

$$\sin 75^\circ =$$

$$\cos\left(\frac{\pi}{12}\right) =$$

$$\sin -15^\circ =$$

$$\csc 15^\circ$$

$$\cos\left(\frac{7\pi}{12}\right) =$$

C12 - 6.5 - Simplify Sum Difference WS

Simplify to a single trigonometric identity:

$$\cos 2x \cos x + \sin 2x \sin x$$

$$\sin 3x \cos x - \cos 3x \sin x$$

$$\sin A \cos 2A + \cos A \sin 2A$$

$$\cos B \cos 3B - \sin B \sin 3B$$

Find the exact value of:

$$\cos\left(\frac{\pi}{3}\right) \cos\left(\frac{\pi}{6}\right) + \sin\left(\frac{\pi}{3}\right) \sin\left(\frac{\pi}{6}\right)$$

$$\sin\left(\frac{11\pi}{12}\right) \cos\left(\frac{\pi}{12}\right) - \cos\left(\frac{11\pi}{12}\right) \sin\left(\frac{\pi}{12}\right)$$

C12 - 6.6 - Double Angle HW

Simplify the following.

$$4 \sin 3x \cos 3x =$$

$$6 \sin \frac{x}{2} \cos \frac{x}{2} =$$

$$8 \sin\left(\frac{\pi}{4}\right) \cos\frac{\pi}{4} =$$

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

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

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

$$2 \cos^2 \frac{x}{4} - 1 =$$

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

$$3 - 6 \sin^2 3x =$$

$$2 \cos^2 \frac{\pi}{2} - 1 =$$

$$\sec 10x (\sin^2 5x - \cos^2 5x) =$$

$$2 \sin 4x (\cos^2 2x - \sin^2 2x) =$$

C12 - 6.6 - Double Angle HW

Simplify the following.

$$1 + \cos 2x =$$

$$1 - \cos 2x =$$

$$\cos 2x + 1 =$$

$$\cos 2x - 1 =$$

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

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

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

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

C12 - 6.6 - Solve Double Angle WS (See 4.5 Notes)

$$\sin x \cos x = 0$$

$$\sin 2x = 0$$

$$\sin 2x = 1$$

$$\cos 2x = 0$$

$$\cos 2x = -1$$

$$\cos 2x = 1$$

$$\sin 4x = 0$$

$$\cos 3x = -1$$

$$\cos\left(\frac{x}{2}\right) = 1$$

$$\sin\left(\frac{1}{3}x\right) = -1$$

C12 - 6.6 - Solve Double Angle WS (See 4.5 Notes)

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

$$\sin x + \cos 2x = 1$$

$$\sin x - \cos 2x = -1$$

$$\sin 2x = -\sin x$$

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

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

$$\cos^2 x - \cos 2x = 1$$

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

$$\cos x + \cos 2x = 0$$

$$\cos x - \cos 2x = 0$$

$$3\sin x + \cos 2x = -1$$

$$3\cos x + \cos 2x = 1$$

C12 - 6.6 - Solve Double Angle WS (See 4.5 Notes)

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

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

$$\cos\left(\frac{x}{2}\right) = \frac{1}{2}$$

$$\cos 3x = \frac{\sqrt{3}}{2}$$

$$\tan 2x = \sqrt{3}$$

$$\sin 4x = \frac{1}{\sqrt{2}}$$

$$\sin\left(\frac{1}{3}x\right) = \frac{\sqrt{3}}{2}$$

C12 - 6.6 - Solve Double Angle WS (See 4.5 Notes)

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

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

$$2\sin x \cos x + 1 = 0$$

$$4\cos^2 2x - \sqrt{3} = 0$$

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

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