C12 - 6.1 - Multiply Simplify WS

Simplify

$sinxsecx$ $cosxcosx$ $tanxcotx$ $cscxcscx$

$sinxsinx$ $cosxsecx$ $tanxcscx$ $secxsecx$

$sinxcosx$ $cosxcscx$ $tanxtanx$ $cotxssecx$

$sinxcotx$ $cosxtanx$ $cotxcotx$

$sinxcscx$ $cosxsinx$ $tanxsinxcotx$

Simplify to $sinx$ and $cosx$

$sinxtanx$ $cosxcotx$ $tanxsecx$ $cscxcotx$ $cscxsecx$

C12 - 6.1 - Multiply Simplify WS

Simplify

$\sin^2 x\csc x$

$\csc^2 x\ \sin x$

$\csc x\cos^2 x$

$\sec^2 x\cos x$

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

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

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

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

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

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

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

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

C12 - 6.1 - Divide Simplify WS

Simplify

$\frac{sinx}{sinx}$ $\frac{sinx}{cosx}$ $\frac{1}{sinx}$ $\frac{cscx}{cscx}$ $\frac{1}{tanx}$

$\frac{cotx}{cotx}$ $\frac{1}{cosx}$ $\frac{1}{cotx}$ $\frac{secx}{secx}$

$\frac{cosx}{cosx}$ $\frac{1}{cscx}$ $\frac{tanx}{tanx}$ $\frac{cosx}{sinx}$ $\frac{1}{secx}$

$\frac{sinx}{tanx}$ $\frac{cosx}{cotx}$ $\frac{cosx}{tanx}$ $\frac{cosx}{cotx}$ $\frac{sinx}{cotx}$

$\frac{tanx}{sinx}$ $\frac{tanx}{cosx}$ $\frac{secx}{cosx}$ $\frac{cscx}{cosx}$ $\frac{cotx}{cosx}$

Try it in your head!

$\frac{cosx}{secx}$ $\frac{cosx}{cscx}$ $\frac{tanx}{cscx}$ $\frac{secx}{tanx}$ $\frac{cotx}{secx}$

$\frac{cscx}{tanx}$ $\frac{secx}{cotx}$ $\frac{cscx}{secx}$ $\frac{cscx}{cotx}$

C12 - 6.1 - Multiply Divide Simplify WS

Simplify

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

$\frac{cosxtanx}{secx}$

$\frac{cscxtanx}{cscx}$

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

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

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

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

C12 - 6.2 - FOIL Factor WS

Distribute/Foil

$sinx(1 - sinx)$

$cosx(sinx + 1)$

$sinx(1 + sinx)$

$(1 + cosx)(1 - cosx)$

$(1 + sinx)(1 - sinx)$

$(sinx - cosx)^2$

$(sinx + 2)(sinx - 1)$

$(cosx + 1)(cosx - 3)$

Factor

$\sin x - \sin^2 x$

$sinxcosx + cosx$

$cosx + \cos^2 x$

$1 - \sin^2 x$

$1 - \cos^2 x$

$1 + \sin^2 x$

$cos^2 x + cosx - 2$

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

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

$cscx^2 - 2cscx - 3$

$2sinx - \frac{1}{sinx} + 1$

C12 - 6.2 - FOIL Factor WS

Distribute/Foil

$(sinx - 2)(sinx + 1)$

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

$(sinx + 1)(sinx + 1)$

$cosx(cosx + 1)(cosx - 1)$

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

Factor

$\sin^2 x + 3sinx + 2$

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

$\sin^4 x - 1$

$\sin^3 x - sinx$

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

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

C12 - 6.2 - FOIL Factor Fractions WS

Distribute/Foil

$(secx + 1)(secx - 1)$

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

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

$$\frac{(cscx + cotx)(cscx - cotx)}{\sin^2 x}$$

$Factor$

$$\frac{\sin^2 x - \cos^2 x}{sinx + cosx}$$

C12 - 6.2 - Solve Factor Fractions WS

$sinx(1 - sinx) = 0$

$cosx(sinx + 1) = 0$

$sinx(1 + sinx) = 0$

$(1 + cosx)(1 - cosx) = 0$

$(1 + sinx)(1 - sinx) = 0$

$(sinx + 2)(sinx - 1) = 0$

$(cosx + 1)(cosx - 3) = 0$

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

$sinxcosx + cosx = 0$

$cosx + \cos^2 x = 0$

$1 - \sin^2 = 0$

$1 - \cos^2 x = 0$

$1 + \sin^2 x = 0$

$cos^2 x + cosx - 2 = 0$

$cosx^2 - 2cosx - 3 = 0$

$2sinx^2 + sinx - 1 = 0$

$2cosx - \frac{1}{secx} + 1 = 0$

$2cosx - \frac{1}{cosx} + 1 = 0$

C12 - 6.2 - Add Subtract Fractions WS

Simplify

$\frac{1}{cosx} + \frac{sinx}{cosx}$

$\frac{cosx}{sinx} + \frac{1}{sinx}$

$cotx + cscx$

$secx + tanx$

$sinx + cscx$

$sinx + secx$

$cosx + secx$

$cosx + cscx$

$sinx - secx$

$cosx - cotx$

$cosx + sinxtanx$

$sinx + cosxcotx$

C12 - 6.2 - Add Subtract Fractions Pythag WS

Simplify

$cscx - cotxcosx$ $secx - tanxsinx$ $cscx\,cos^2 x + sinx$ $secx\,sin^2 x + cosx$

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

$\frac{cosx + cotx}{1 + sinx}$ $\csc^2 x - \frac{cotx}{sinx}$

C12 - 6.2 - Add Subtract Fractions Pythag WS

Simplify

$$\frac{1}{1-sinx}+\frac{1}{1+sinx}$$

$$\frac{cosx}{1+cosx}+\frac{cosx}{1-cosx}$$

$$\frac{1}{1-sinx}-\frac{1}{1+sinx}$$

$$\frac{cosx}{1+cosx}-\frac{cosx}{1-cosx}$$

$$\frac{1}{1+cosx}-\frac{1}{1-cosx}$$

$$\frac{cosx}{1+sinx}+\frac{1+sinx}{cosx}$$

C12 - 6.2 - Add Subtract Complex Fractions WS

Simplify

$\dfrac{1+\dfrac{1}{sinx}}{cotx}$

$\dfrac{1+\dfrac{1}{cosx}}{tanx}$

$\dfrac{secx}{1+\dfrac{1}{cosx}}$

$\dfrac{tanx}{1+\dfrac{1}{cosx}}$

$\dfrac{secx}{1+\dfrac{sinx}{cosx}}$

$\dfrac{1+sinx}{1+cscx}$

$\dfrac{1+cscx}{1+secx}$

$\dfrac{1+tanx}{1+cotx}$

$\dfrac{cscx+secx}{cotx+1}$

$\dfrac{cscx+secx}{tanx+1}$

C12 - 6.4 - Proofs Reciprocals WS

Prove the left hand side equals the right hand side

$sinxsecx$	$tanx$

$cosxtanx$	$sinx$

$sinxcscx$	1

$cosxcscx$	$cotx$

$cosxsecx$	1

$tanxcscx$	$secx$

$cotxsecx$	$cscx$

$sinxcotx$	$cosx$

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

$cotxcotx$	$\cot^2 x$

$cosxsinx$	$sinxcosx$

$\sin^2 x$	$sinxsinx$

$tanxsecx$	$\frac{sinx}{\cos^2 x}$

$tanxcotx$	1

$Make\ one\ up!$

C12 - 6.4 - Proofs Reciprocals WS

Prove the left hand side equals the right hand side

$\frac{sinx}{tanx}$	$cosx$

$\frac{cosx}{secx}$	$\cos^2 x$

$\frac{1}{cosx}$	$secx$

$\frac{tanx}{sinx}$	$secx$

$\frac{tanx}{cosx}$	$\frac{sinx}{\cos^2 x}$

$\frac{sinx}{sinx}$	1

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

$\frac{sinx}{cosx}$	$tanx$

$\frac{cosx}{cotx}$	$sinx$

$\frac{secx}{tanx}$	$cscx$

$\frac{tanx}{cscx}$	$secx$

$\frac{cscx}{cotx}$	$cosx$

C12 - 6.4 - Proofs Add Subtract Frac WS

Prove the left hand side equals the right hand side

$cotx + cscx$ | $\frac{cosx + 1}{sinx}$

$\frac{1 + sinx}{cosx}$ | $secx + tanx$

$sinx + cscx$ | $\frac{\sin^2 x + 1}{sinx}$

$sinx + secx$ | $\frac{sinxcosx + 1}{cosx}$

$2sinx - \frac{1}{cscx}$ | $sinx$

$secx - tanxsinx$ | $cosx$

C12 - 6.4 - Proofs Add Subtract Frac Pythag WS

Prove the left hand side equals the right hand side

$cosx + sinxtanx$	$secx$

$cscx\,cos^2 x + sinx$	$cscx$

$\frac{cosx + cotx}{1 + sinx}$	$cotx$

$\csc^2 x - \frac{cotx}{sinx}$	$\frac{1}{1 + cosx}$

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

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

C12 - 6.4 - Proofs Add Subtract Frac Pythag WS

Prove the left hand side equals the right hand side

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

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

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

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

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

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

C12 - 6.4 - Proofs FOIL Factor Pythag WS

Prove the left hand side equals the right hand side

$(sinx - 2)(sinx + 1)$ | $\sin^2 x - sinx - 2$

$(1 + sinx)(1 - sinx)$ | $\cos^2 x$

$(1 + cosx)(1 - cosx)$ | $\sin^2 x$

$(2cosx - 1)(cosx + 2)$ | $2\cos^2 x + 3cosx - 2$

C12 - 6.4 - Proofs Add Subtract Foil Factor Pythag WS

Prove the left hand side equals the right hand side

$\frac{(cscx + cotx)(cscx - cotx)}{\sin^2 x}$ | $\csc^2 x$

$\frac{cosx}{1 + sinx} + \frac{1 + sinx}{cosx}$ | $2secx$

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

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

$\frac{1}{1 - cosx} - \frac{1}{1 + cosx}$ | $2cotxcscx$

$(sinx - cosx)^2$ | $1 - 2sinxcosx$

C12 - 6.4 - Proofs Add Subtract Foil Factor Pythag WS

Prove the left hand side equals the right hand side

$cosx - cotx$	$\frac{sinx(1 + cosx)}{sinx}$

$secx\ sin^2 x + cosx$	$secx$

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

$sinx - cscx$	$\frac{-\cos^2 x}{sinx}$

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

$\frac{1 + sinx}{1 + cscx}$	$\frac{sinx}{1 - sinx}$

C12 - 6.4 - Proofs Add Subtract Comp Frac Pythag WS

Prove the left hand side equals the right hand side

$\frac{cosx + 1}{sinx}$ | $1 + \frac{1}{\frac{cosx}{tanx}}$

$\frac{1 + \frac{1}{sinx}}{cotx}$ | $\frac{1 + sinx}{cosx}$

$\frac{cscx}{1 + \frac{1}{sinx}}$ | $\frac{1}{1 + sinx}$

$\frac{cosx}{1 + sinx}$ | $\frac{cotx}{1 + \frac{1}{sinx}}$

$\frac{cscx}{1 + \frac{cosx}{sinx}}$ | $\frac{1}{sinx + cosx}$

$\frac{1}{1 + tanx}$ | $\frac{cosx}{sinx + cosx}$

C12 - 6.4 - Proofs Add Subtract Comp Frac Pythag WS

Prove the left hand side equals the right hand side

$\frac{1 + sinx}{1 + cscx}$ | $sinx$

$cosx$ | $\frac{1 + cosx}{1 + secx}$

$\frac{1 + secx}{1 + cscx} + 1$ | 2

$\frac{1 + cotx}{1 + tanx}$ | $cotx$

$\frac{cscx + secx}{cotx + 1}$ | $secx$

$cscx$ | $\frac{cscx + secx}{tanx + 1}$

C12 - 6.4 - Proofs Conjugate HW

$\frac{sinx}{1+cosx}$	$\frac{1-cosx}{sinx}$

$\frac{cosx}{1-sinx}$	$\frac{1+sinx}{cosx}$

$\frac{sinx}{1-cosx}$	$\frac{1+cosx}{sinx}$

$\frac{cosx}{1+sinx}$	$\frac{1-sinx}{cosx}$

$secx+tanx$	$\frac{cosx}{1-sinx}$

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:

$cos15^o$ =

$sin75^o$ =

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

$sin{-}15^o$ =

$csc15^0$

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

C12 - 6.5 - Simplify Sum Difference WS

Simplify to a single trigonometric identity:

$cos2x\ cosx + sin2x\ sinx$

$sin3x\ cosx - cos3x\ sinx$

$sinA\ cos2A + cosA\ sin2A$

$cosB\ cos3B - sinB\ sin3B$

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 - Simplify Double Angle WS

Simplify the following.

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

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

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

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

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

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

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

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

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

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

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

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

C12 - 6.6 - Simplify Double Angle WS

Simplify the following.

$1 + cos2x =$

$1 - cos2x =$

$cos2x + 1 =$

$cos2x - 1 =$

$\frac{1 + cos2x}{\sin^2 x} =$

$\frac{1 - cos2x}{\tan^2 x} =$

$\frac{cos2x - 1}{\sin^2 x} =$

$\frac{cos2x - 1}{2\csc^2 x} =$

C12 - 6.6 - Solve Double Angle Unit WS

$sinxcosx = 0$

$sin2x = 0$

$sin2x = 1$

$cos2x = 0$

$cos2x = -1$

$cos2x = 1$

$sin4x = 0$

$cos3x = -1$

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

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

C12 - 6.6 - Solve Double Angle Unit Factor WS

$sin2x + cosx = 0$

$sinx + cos2x = 1$

$sinx - cos2x = -1$

$sin2x = -sinx$

$\sin^2 x + cos2x = 0$

$\cos^2 x - cos2x = 0$

$\cos^2 x - cos2x = 1$

$sinx - cos2x = 0$

$cosx + cos2x = 0$

$cosx - cos2x = 0$

$3sinx + cos2x = -1$

$3cosx + cos2x = 1$

C12 - 6.6 - Solve Double Angle ASTC WS

$sin2x = \frac{1}{2}$

$cos2x = -\frac{1}{\sqrt{2}}$

$sin4x = \frac{1}{\sqrt{2}}$

$cos3x = \frac{\sqrt{3}}{2}$

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

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

$tan2x = \sqrt{3}$

C12 - 6.6 - Solve Double Angle Unit ASTC WS

$2cotxsin^2x = 1$

$2tanxscos^2x = \frac{1}{2}$

$2sinxcosx + 1 = 0$

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

$cos2x = 2\sin^2 x$

x^2=1/4

C12 - 6.7 - NPVs WS

$Denominator \neq 0$

Determine the non-permissible values of x in radians, for the following expressions.

$\frac{\mathbf{1}}{\boldsymbol{sinx}}$ $\frac{\boldsymbol{sinx}}{\boldsymbol{cosx}}$ $\frac{\boldsymbol{cosx}}{\mathbf{1}-\boldsymbol{sinx}}$ $\frac{\boldsymbol{sinx}}{\boldsymbol{cosx}+\mathbf{1}}$

$\boldsymbol{cscx}$ $\boldsymbol{secx}$ $\frac{\boldsymbol{cosx}}{\mathbf{5}}$ $\frac{1}{cscx}$ $tanx$

$\frac{1}{tanx}$ $\frac{tanx}{sinx}$ $\frac{cscx}{tanx}$ $\frac{cotx}{tanx}$

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

$\frac{\mathbf{1}}{\boldsymbol{sinx}-\boldsymbol{cosx}}$ $\frac{\mathbf{1}}{\boldsymbol{sinx}-\boldsymbol{tanx}}$