

Trig Identities & Equations

Unit 11.2A – Verifying Trig IDs

Verify that each of the following is an identity.

#1) $\frac{1}{\sec^2 \theta} + \frac{1}{\csc^2 \theta} = 1$

#2) $\frac{\sin A}{\csc A} + \frac{\cos A}{\sec A} = 1$

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$$\#3) \quad \frac{1+\tan \gamma}{1+\cot \gamma} = \frac{\sin \gamma}{\cos \gamma}$$

$$\#4) \quad \cos^2 x + \tan^2 x \cos^2 x = 1$$

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#5) $1 - \cot^4 x = 2\csc^2 x - \csc^4 x$

#6) $\frac{\sec x - 1}{\sec x + 1} + \frac{\cos x - 1}{\cos x + 1} = 0$

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#7) $\frac{\cos x}{1+\sin x} + \frac{\cos x}{1-\sin x} = 2 \sec x$

#8) $1 + \sec^2 x \sin^2 x = \sec^2 x$

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Unit 11.2A – Verifying Trig IDs

Find a numerical value of one trig function of each x.

#9) $2\sin^2 x = 3\cos^2 x$

#10) $1 - \sin^2 x = \frac{1}{9}$

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#11) $1 + \tan^2 x = \sin^2 x + \frac{1}{\sec^2 x}$

You only need one answer for any of these problems.

#9) $\sin x = \pm \frac{\sqrt{15}}{5}$, $\csc x = \pm \frac{\sqrt{15}}{3}$,
 $\cos x = \pm \frac{\sqrt{10}}{5}$, $\sec x = \pm \frac{\sqrt{10}}{2}$,
 $\tan x = \pm \frac{\sqrt{6}}{2}$, $\cot x = \pm \frac{\sqrt{6}}{3}$

#10) $\sin x = \pm \frac{2\sqrt{2}}{3}$, $\csc x = \pm \frac{3\sqrt{2}}{4}$,
 $\cos x = \pm \frac{1}{3}$, $\sec x = \pm 3$,
 $\tan x = \pm 2\sqrt{2}$, $\cot x = \pm \frac{\sqrt{2}}{4}$

#11) $\sin x = 0$, $\csc x = \text{undefined}$,
 $\cos x = \pm 1$, $\sec x = \pm 1$,
 $\tan x = 0$, $\cot x = \text{undefined}$

<http://is.gd/NuHw2A> YouTube

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

Verify that each of the following is an identity.

#1) $\frac{\tan x \cos x}{\sin x} = 1$

#2) $\frac{1+\tan^2 \theta}{\csc^2 \theta} = \tan^2 \theta$

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

$$\#3) \quad \frac{\sec \alpha}{\sin \alpha} - \frac{\sin \alpha}{\cos \alpha} = \cot \alpha$$

$$\#4) \quad \tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$$

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

$$\#5) \quad \sin \theta + \cos \theta = \frac{1 + \tan \theta}{\sec \theta}$$

$$\#6) \quad \sec^4 \alpha - \sec^2 \alpha = \frac{1}{\cot^4 \alpha} + \frac{1}{\cot^2 \alpha}$$

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

$$\#7) \quad \frac{\sec B}{\cos B} - \frac{\tan B}{\cot B} = 1$$

$$\#8) \quad \frac{1 - 2 \cos^2 x}{\sin x \cos x} = \tan x - \cot x$$

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

Find a numerical value of one trig function of each x.

#9) $\frac{\tan x}{\sin x} = \sqrt{2}$

#10) $\frac{\sin x \sec x}{\cot x} = \frac{9}{16}$

Trig Identities & Equations

Unit 11.2B – Verifying Trig IDs

#11) $\frac{\cos x \tan x}{\csc x} = \frac{1}{9}$

You only need one answer for any of these problems.

#9) $\sin x = \frac{\sqrt{2}}{2}, \csc x = \sqrt{2},$
 $\cos x = \frac{\sqrt{2}}{2}, \sec x = \sqrt{2},$
 $\tan x = 1, \cot x = 1$

#10) $\sin x = \pm \frac{4}{5}, \csc x = \pm \frac{5}{4},$
 $\cos x = \pm \frac{3}{5}, \sec x = \pm \frac{5}{3},$
 $\tan x = \pm \frac{3}{4}, \cot x = \pm \frac{4}{3}$

#11) $\sin x = \pm \frac{1}{3}, \csc x = \pm 3,$
 $\cos x = \pm \frac{2\sqrt{2}}{3}, \sec x = \pm \frac{3\sqrt{2}}{4},$
 $\tan x = \pm \frac{\sqrt{2}}{4}, \cot x = \pm 2\sqrt{2}$

<http://is.gd/Nu2BHw>

Trig Identities & Equations

Unit 11.2C – Verifying Trig IDs

Verify that each of the following is an identity.

#1) $\frac{\csc x}{\cot x + \tan x} = \cos x$

#2)

$$\sin^3 x - \cos^3 x = (1 + \sin x \cos x)(\sin x - \cos x)$$

Trig Identities & Equations

Unit 11.2C – Verifying Trig IDs

$$\#3) \quad \frac{1}{\sin y - 1} - \frac{1}{\sin y + 1} = -2 \sec^2 y$$

$$\#4) \quad 1 - 2 \sin^2 r + \sin^4 r = \cos^4 r$$

Trig Identities & Equations

Unit 11.2C – Verifying Trig IDs

$$\#5) \quad \tan \mu + \frac{\cos \mu}{1 + \sin \mu} = \sec \mu$$

$$\#6) \quad \frac{\tan x + \sec x}{\sec x - \cos x + \tan x} = \csc x$$

Trig Identities & Equations

Unit 11.2C – Verifying Trig IDs

Find a numerical value of one trig function of each x.

#7) $\sin x = 3 \cos x$

#8) $\cos x = \cot x$

You only need one answer for any of these problems.

#7) $\sin x = \frac{3\sqrt{10}}{10}$, $\csc x = \frac{\sqrt{10}}{3}$,
 $\cos x = \frac{\sqrt{10}}{10}$, $\sec x = \sqrt{10}$,
 $\tan x = 3$, $\cot x = \frac{1}{3}$,

#8) $\sin x = 1$, $\csc x = 1$
 $\cos x = 0$, $\sec x = \text{und}$
 $\tan x = \text{und}$, $\cot x = 0$

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Trig Identities & Equations

Unit 11.2D – Verifying Trig IDs

#1) If $\cot \theta = \frac{6}{5}$, find $\tan \theta$.

Verify that the equation is an identity.

#2)
$$\frac{\cot x + \cos x \sin x}{\tan x} + \frac{\cos x \sin x}{\cot x} = \csc^2 x$$

Trig Identities & Equations

Unit 11.2D – Verifying Trig IDs

Simplify

#3) $\cos x \cot x + \sin x.$

Verify that the equation is an identity.

#4) $\frac{\tan B \sin B}{\sec B} + \cos^2 B = \sec^2 B - \frac{\tan B}{\cot B}$

Trig Identities & Equations

Unit 11.2D – Verifying Trig IDs

Verify that the equation is an identity.

#5) $\tan \theta + \frac{\cos \theta}{1 + \sin \theta} = \sec \theta$

Find a numerical value of one trig function of each x.

#6) $\frac{\sin x}{\cot x} + \cos x = 4$

Trig Identities & Equations

Unit 11.2D – Verifying Trig IDs

Find a numerical value of one trigonometric function
#7) $\sin x = \tan x$.

You only need one answer for any of these problems.

#1) $\cot x = \frac{5}{6}$

#3) $\csc x$

#6) $\sin x = \frac{\sqrt{15}}{4}$, $\csc x = \frac{4\sqrt{15}}{15}$,

$\cos x = \frac{1}{4}$, $\sec x = 4$,

$\tan x = \sqrt{15}$, $\cot x = \frac{\sqrt{15}}{15}$,

#7) $\sin x = 0$, $\csc x = \text{und}$

$\cos x = 1$, $\sec x = 1$

$\tan x = 0$, $\cot x = \text{und}$

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Trig Identities & Equations

Unit 11.2E – Verifying Trig IDs

Simplify

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

#2) $\cos^4 \alpha + 2 \cos^2 \alpha \sin^2 \alpha + \sin^4 \alpha$

Trig Identities & Equations

Unit 11.2E – Verifying Trig IDs

Verify that the equation is an identity.

#3) $(\csc x - \cot x)^2 = \frac{1 - \cos x}{1 + \cos x}$

#4) $(\sin \theta - 1)(\tan \theta + \sec \theta) = -\cos \theta$

Trig Identities & Equations

Unit 11.2E – Verifying Trig IDs

Find a numerical value of one trigonometric function

#5) $\csc x = \sin x \tan x + \cos x$

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

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Unit 11.2E – Verifying Trig IDs

You only need one answer for any of these problems.

#1) 1

#2) 1

#5) $\sin x = \frac{\sqrt{2}}{2}$, $\csc x = \sqrt{2}$

$\cos x = \frac{\sqrt{2}}{2}$, $\sec x = \sqrt{2}$

$\tan x = 1$, $\cot x = 1$

#6) $\sin x = \frac{\sqrt{5}}{5}$, $\csc x = \sqrt{5}$

$\cos x = \frac{2\sqrt{5}}{5}$, $\sec x = \sqrt{5}$

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

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