11.2 Negative and Pythagorean Identities

NOTES

Write your questions here!

Identities for Negatives

Reduce to a single Trig expression

Ex 1: $\frac{\sin(-x)}{\cos(-x)}$

Ex 2: $\tan(-\propto)\ \csc(-\propto)$

Pythagorean Identities

Reduce to a single Trig expression

Ex 3: $\frac{\tan\theta\cos\theta}{\csc\theta}$

HOT TIP #1: Write everything in sin and cos!

HOT TIP #2: Look for an identity!

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

Verify the following identity

Ex 5:

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

HOT TIP #3: Use algebra to make equivalent expressions!

Verify the following identity

Ex 6: $\cot x \cos x + \sin x = \csc x$

HOT TIP #4: Combine the fractions.

Bring the PAIN!

Ex 7: $tan^2\theta - sin^2\theta = tan^2\theta\, sin^2\theta$

Bring the HEAT!

Ex 8: $\frac{\tan\propto - \cot\propto}{\tan\propto + \cot\propto} = 1 - 2\,cos^2\propto$

Now, ummarize our notes here!

SUMMARY:

11.2 Negative and Pythagorean Identities

PRACTICE

Directions: Simplify to a single trig expression.

1) $\sin(-\alpha)\cot(-\alpha)$

2) $\dfrac{\tan(-u)\cot(-u)}{\csc(-u)}$

3) $\dfrac{(1-\cos x)(1+\cos x)}{cos^2\, x}$

Directions: Verify the identity.

4) $sin^3\, x + \sin x\, cos^2\, x = \sin x$

5) $\dfrac{1}{sec^2\, x} + \dfrac{1}{csc^2\, x} = 1$

6) $\dfrac{1+\tan\gamma}{1+\cot\gamma} = \tan\gamma$

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

8) $tan^2\,\theta\,cos^2\,\theta = 1 - cos^2\,\theta$

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

10) $cos^2\,\lambda + tan^2\lambda\,cos^2\lambda = 1$

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

12) $\sin\beta\,(\csc\beta - \sin\beta) = cos^2\,\beta$

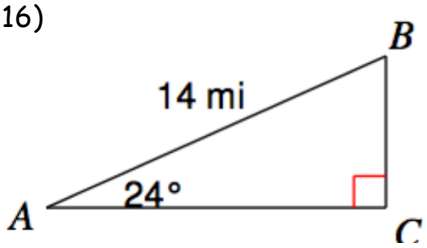
13) $\cot x - \tan x = \frac{2\,cos^2\,x - 1}{\sin x \cos x}$

14) $sin^2\ x\ cos^3\ x = (sin^2 x - sin^4 x)(\cos x)$

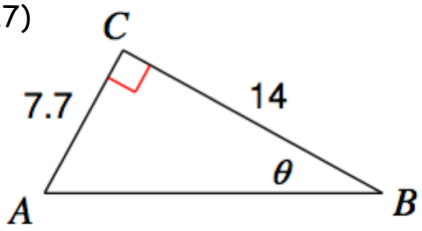
15) $cos^2\ x = \frac{\csc x \cos x}{\tan x + \cot x}$

Review Skillz: Solve each triangle. (find all sides and angles).

16)



17)



11.2 Application and Extension

1) Simplify to a single trig expression.

$$\frac{\tan\theta + \cot\theta}{\csc\theta}$$

2) Verify the identity.

$$cos^2\ x + cos^2\ x\ tan^2\ x = 1$$

3) For each equation try the following values $\left(x = 0, \pi, \frac{\pi}{2}, \frac{\pi}{4}, \frac{\pi}{6}\right)$ and calculate both the left and right sides of the equation. If the equation is an identity, VERIFY IT! If it is not an identity, find a value of x for which both sides are defined but not equal.

a) $sin^2\, x - cos^2\, x = -1$

b) $tan^2\, x - sin^2\, x = tan^2\, x\, sin^2\, x$

4) BRING THE PAIN! Use your graphing calculator and determine which of the following three equations is a trig identity. Then verify it!

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

$$\frac{sin^2\, \theta + 4 \sin \theta + 3}{cos^2\, \theta} = \frac{3 + \sin \theta}{1 - \sin \theta}$$

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