November 8

SWBAT:

Use trig identities to verify equations

Reciprocal Identities

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\quad \csc(\theta) = \frac{1}{\sin(\theta)}$

$\cos(\theta) = \frac{1}{\sec(\theta)}$ $\quad \sec(\theta) = \frac{1}{\cos(\theta)}$

$\tan(\theta) = \frac{1}{\cot(\theta)}$ $\quad \cot(\theta) = \frac{1}{\tan(\theta)}$

Quotient Identities

$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$

$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

Pythagorean Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$

$1 + \cot^2(\theta) = \csc^2(\theta)$

$\tan^2(\theta) + 1 = \sec^2(\theta)$

Cofunction Identities

$\sin(\alpha) = \cos(90 - \alpha)$ $\quad \tan(\alpha) = \cot(90 - \alpha)$ $\quad \sec(\alpha) = \csc(90 - \alpha)$

$\cos(\alpha) = \sin(90 - \alpha)$ $\quad \cot(\alpha) = \tan(90 - \alpha)$ $\quad \csc(\alpha) = \sec(90 - \alpha)$

Cofunction Identities

$\sin(\alpha) = \cos(90 - \alpha)$
$\cos(\alpha) = \sin(90 - \alpha)$
$\tan(\alpha) = \cot(90 - \alpha)$
$\cot(\alpha) = \tan(90 - \alpha)$
$\sec(\alpha) = \csc(90 - \alpha)$
$\csc(\alpha) = \sec(90 - \alpha)$

Reciprocal Identities

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$
$\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$
$\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

Pythagorean Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$
$1 + \cot^2(\theta) = \csc^2(\theta)$
$\tan^2(\theta) + 1 = \sec^2(\theta)$

Quotient Identities

$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

show:
$\cos(\beta)\sec(\beta)=1$

$\cos\beta \cdot \sec\beta = 1$

$\sec(\theta) = \frac{1}{\cos(\theta)}$ ⟵ reciprocal identity

$\cos\beta \cdot \frac{1}{\cos\beta} = 1$

$\frac{\cos\beta}{\cos\beta} = 1$

$1 = 1$

Cofunction Identities

$\sin(\alpha) = \cos(90 - \alpha)$
$\cos(\alpha) = \sin(90 - \alpha)$
$\tan(\alpha) = \cot(90 - \alpha)$
$\cot(\alpha) = \tan(90 - \alpha)$
$\sec(\alpha) = \csc(90 - \alpha)$
$\csc(\alpha) = \sec(90 - \alpha)$

Reciprocal Identities

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$
$\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$
$\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

Pythagorean Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$
$1 + \cot^2(\theta) = \csc^2(\theta)$
$\tan^2(\theta) + 1 = \sec^2(\theta)$

Quotient Identities

$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

show:
$(1+\cos\theta)(1-\cos\theta)=\sin^2\theta$

$(1+\cos\theta)(1-\cos\theta) = \sin^2\theta$

multiply ⟶ $1-\cos\theta+\cos\theta-\cos^2\theta = \sin^2\theta$

$1-\cos^2\theta = \sin^2\theta$

$\sin^2(\theta) + \cos^2(\theta) = 1$

pythagorean identity ⟶ $(\sin^2\theta + \cos^2\theta) - \cos^2\theta = \sin^2\theta$

$\sin^2\theta = \sin^2\theta$

Cofunction Identities

$\sin(\alpha) = \cos(90 - \alpha)$
$\cos(\alpha) = \sin(90 - \alpha)$
$\tan(\alpha) = \cot(90 - \alpha)$
$\cot(\alpha) = \tan(90 - \alpha)$
$\sec(\alpha) = \csc(90 - \alpha)$
$\csc(\alpha) = \sec(90 - \alpha)$

Reciprocal Identities

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$
$\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$
$\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

Pythagorean Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$
$1 + \cot^2(\theta) = \csc^2(\theta)$
$\tan^2(\theta) + 1 = \sec^2(\theta)$

Quotient Identities

$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

show:
$\sin^2\alpha - \cos^2\alpha = 2\sin^2\alpha - 1$

$$\sin^2\alpha - \cos^2\alpha = 2\sin^2\alpha - 1$$

$\sin^2(\theta) + \cos^2(\theta) = 1$

$$\sin^2\alpha - \cos^2\alpha = 2\sin^2\alpha - (\sin^2\alpha + \cos^2\alpha)$$
$$\sin^2\alpha - \cos^2\alpha = 2\sin^2\alpha - \sin^2\alpha - \cos^2\alpha$$
$$\sin^2\alpha - \cos^2\alpha = \sin^2\alpha - \cos^2\alpha$$

Cofunction Identities

$\sin(\alpha) = \cos(90 - \alpha)$
$\cos(\alpha) = \sin(90 - \alpha)$
$\tan(\alpha) = \cot(90 - \alpha)$
$\cot(\alpha) = \tan(90 - \alpha)$
$\sec(\alpha) = \csc(90 - \alpha)$
$\csc(\alpha) = \sec(90 - \alpha)$

Reciprocal Identities

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$
$\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$
$\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

Pythagorean Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$
$1 + \cot^2(\theta) = \csc^2(\theta)$
$\tan^2(\theta) + 1 = \sec^2(\theta)$

Quotient Identities

$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

show:
$\cot^2 x + \cot^4 x = \csc^4 x - \csc^2 x$

$$\cot^2 x + \cot^4 x = \csc^4 x - \csc^2 x$$
$$\cot^2 x(1 + \cot^2 x) = \csc^4 x - \csc^2 x$$

$1 + \cot^2(\theta) = \csc^2(\theta)$

pythagorean identity

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

$1 + \cot^2(\theta) = \csc^2(\theta)$

pythagorean identity

$$\cot^2 x(\csc^2 x) = \csc^2 x(1 + \cot^2 x - 1)$$
$$\cot^2 x(\csc^2 x) = \csc^2 x(\cot^2 x)$$

$\tan(\alpha)\cot(\alpha) = 1$

$$\tan(\alpha)\cot(\alpha) = 1$$

$$\tan(\alpha)\left(\frac{1}{\tan(\alpha)}\right)$$

$$\frac{\tan(\alpha)}{\tan(\alpha)} = 1$$

$$1 = 1$$

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

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

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

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

$\sin^2 y - \sin^4 y = \cos^2 y - \cos^4 y$

$\sin^2 y(1-\sin^2 y) = \cos^2 y(1-\cos^2 y)$

$\sin^2 y(\sin^2 y+\cos^2 y-\sin^2 y) = \cos^2 y(\sin^2 y+\cos^2 y-\cos$

$\sin^2 y(\cos^2 y) = \cos^2 y(\sin^2 y)$

$\cot^2 x(\sec^2 x - 1) = 1$

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

$\cot^2\theta((1+\tan^2\theta)-1) = 1$

$\cot^2\theta(\tan^2\theta) = 1$

$\frac{1}{\tan^2\theta}\cdot\tan^2\theta = 1$

$1 = 1$

$\cot^2 x\cdot\sec^2 x - \cot^2 x = 1$

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

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

$1+\cot^2 x = \csc^2 x$

$\csc^2 x - \cot^2 x = 1$

$1+\cot^2 x - \cot^2 x = 1$

$1 = 1$