November 8

## What is the best thing to happen at TJ so far this year?

November 8

## Students will verbally explain how to use trig identities to verify equations

(using the words: identity, reciprocal, quotient ...)

Show that $\tan^2 x + 1 = \sec^2 x$ is a pythagorean identity

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

$$\boxed{\tan x = \frac{\sin x}{\cos x}}$$

$$\left(\frac{\sin x}{\cos x}\right)^2 + 1 = \sec^2 x$$

$$\boxed{\sec x = \frac{1}{\cos x}}$$

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

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

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

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

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

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

$$\frac{1}{\cos^2 x} = \frac{1}{\cos^2 x} \checkmark$$

**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**

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

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

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

| Reciprocal Identities | Quotient Identities | Pythagorean Identities |
| --- | --- | --- |
| $\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$ | $\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$ | $\sin^2(\theta) + \cos^2(\theta) = 1$ |
| $\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$ | $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$ | $1 + \cot^2(\theta) = \csc^2(\theta)$ |
| $\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$ | | $\tan^2(\theta) + 1 = \sec^2(\theta)$ |

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

* get everything in terms of $\sin\theta$ and/or $\cos\theta$

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

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

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

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

$1 = 1$ ✓


| Reciprocal Identities | Quotient Identities | Pythagorean Identities |
| --- | --- | --- |
| $\sin(\theta) = \frac{1}{\csc(\theta)}$ $\csc(\theta) = \frac{1}{\sin(\theta)}$ | $\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$ | $\sin^2(\theta) + \cos^2(\theta) = 1$ |
| $\cos(\theta) = \frac{1}{\sec(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$ | $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$ | $1 + \cot^2(\theta) = \csc^2(\theta)$ |
| $\tan(\theta) = \frac{1}{\cot(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$ | | $\tan^2(\theta) + 1 = \sec^2(\theta)$ |


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

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

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

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

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

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

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

$\sin^2\theta = \sin^2\theta$ ✓

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## For Test 4 - Thursday 11/ 14

Pg 237 #6-30 (multiples of 3 - skip #21), 41
Pg 200 #3, 5, 7, 13, 15, 19, 20, 25, 31, 35, 48
pg 190 #4 - 18 (even), 32, 36 - 48 (even)