FUNDAMENTAL IDENTITIES

Identities - true for any value

$2(x+5) = 2x+10$

Trig Identities - true for any angle measure

Reciprocal

1. $\csc\theta = \frac{1}{\sin\theta}$
2. $\sec\theta = \frac{1}{\cos\theta}$
3. $\cot\theta = \frac{1}{\tan\theta}$

$\tan\theta = \frac{1}{\cot\theta}$

Ratio

4. $\tan\theta = \frac{\sin\theta}{\cos\theta}$
5. $\cot\theta = \frac{\cos\theta}{\sin\theta}$

Pythagorean

6. $\sin^2\theta + \cos^2\theta = 1$

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

7. $1 + \tan^2\theta = \sec^2\theta$
8. $1 + \cot^2\theta = \csc^2\theta$

$\sin(-x) = -\sin x$

$\cos(-x) = \cos x$

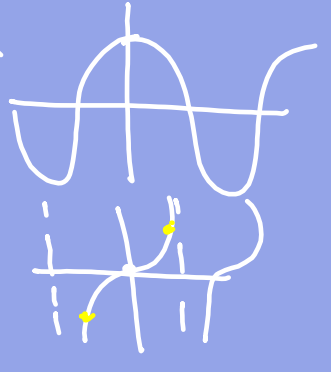
$\tan(-x) = -\tan x$

Even $f(-x) = f(x)$

Odd $f(-x) = -f(x)$

$y = \sin x$

$y = \cos x$



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Simplify.

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

$(1+\tan x)(1+\tan x) - 2\tan x$

$1 + \tan x + \tan x + \tan^2 x - 2\tan x$

$= 1 + \tan^2 x$

$= \sec^2 x$

$\frac{(1+\cos x)\cos x}{(1+\cos x)\sin x} + \frac{\sin x(\sin x)}{1+\cos x(\sin x)}$

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

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

$= \frac{1}{\sin x}$ OR $\csc x$

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Simplify.

$$\frac{\sec^3 x - 8}{\sec^2 x - 4} = \frac{(\sec x - 2)(\sec^2 x + 2\sec x + 4)}{(\sec x + 2)(\sec x - 2)}$$

$$= \frac{\sec^2 x + 2\sec x + 4}{\sec x + 2}$$

VERIFY.

WORK DOWNWARD!

$$\tan^2\theta\left(\frac{1}{\sec^2\theta}\right) + \cot\theta\tan(+\theta) = -\cos^2\theta$$

$$\frac{\sin^2\theta}{\cos^2\theta}\cdot\cos^2\theta - \frac{\cos\theta}{\sin\theta}\cdot\frac{\sin\theta}{\cos\theta}$$

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

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

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$$\frac{\sec\theta}{\sin\theta} \div \frac{\sec\theta}{\csc(-\theta)} = \frac{1}{\tan\theta}$$

$$\frac{\frac{1}{\cos\theta}}{\frac{\sin\theta}{1}} - \frac{\frac{1}{\cos\theta}}{\frac{1}{\sin\theta}} = \frac{1}{\frac{\sin\theta}{\cos\theta}}$$

$$\frac{1}{\sin\theta\cos\theta} - \frac{\sin\theta\sin\theta}{\cos\theta\sin\theta} = \frac{\cos\theta}{\sin\theta}$$

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

$$\frac{\cos^2\theta}{\sin\theta\cos\theta}$$

$$\frac{\cos\theta}{\sin\theta} = \frac{\cos\theta}{\sin\theta}$$