Precalculus

5.1 Verifying Identities

Day 1

★ Fundamental Identities

Not solving an equation!

- only work one side of equation → largest one
- convert everything to sine and cosine
- substitute in identities
- remember factoring

★ can work both sides but independently → don't multiply, add, sub, divide over
↳ only when both sides are long

ex) $\sec x \cot x = \csc x$

$\frac{1}{\cos x} * \frac{\cos x}{\sin x}$

$\frac{1}{\sin x}$

$\csc x$

ex) $\csc x \tan x = \sec x$

$\frac{1}{\sin x} \frac{\sin x}{\cos x}$

$\frac{1}{\cos x}$

$\sec x$

ex) $\sin x \tan x + \cos x = \sec x$

$\sin x \frac{\sin x}{\cos x} + \cos x$

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

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

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

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

$\frac{1}{\cos x}$

$\sec x$

★ Identity

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

ex) $\cos x - \cos x \sin^2 x = \cos^3 x$

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

$\cos x(\cos^2 x)$

$\cos^3 x$

★ factor

★ Identity $\sin^2 x + \cos^2 x = 1$

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

ex) $\cos x \cot x = \dfrac{1 - \sin^2 x}{\sin x}$

★ work w/ "grosser" side

$\dfrac{\cos^2 x}{\sin x}$

★ look to where want to end w/

$\dfrac{\cos x}{1} \quad \dfrac{\cos x}{\sin x}$

$\cos x \cot x$

ex) $\dfrac{\tan x - \sin(-x)}{1 + \cos x} = \tan x$

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

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

$$\frac{\sin x + \sin x \cos x}{\cos x} * \frac{1}{1 + \cos x}$$

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

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

$$\frac{\sin x}{\cos x}$$

$\tan x$