7.2 Verifying Trig Identities

Helpful tips-

🙂when verifying, work with one side only, usually the more complicated side

🙂Use algebra skills (factor, foil, etc.)

🙂Use identities (substitution)

🙂Try converting everything to sine or cosine

🙂Try something!!! You will hit dead ends.

<u>Can do:</u> 🙂

 -work with one side
 -multiply or divide by 1 (or a fancy 1)
 -use identities (substitution)
 -try and try again!

<u>Cannot do</u>:

-solve

-add or subtract from each side

-use magic math

-quit!

Verify:

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

$$\frac{\sec x + 1 - \sec x + 1}{(\sec^2 x - 1)} \quad =$$

$$\frac{2}{\tan^2 x} \quad =$$

$$\boxed{2\cot^2 x = 2\cot^2 x}$$

Verify:

$$\frac{\tan x + \cot y}{\tan x \cot y} = \tan y + \cot x$$

$$\frac{\tan x \; 1}{\tan x \cot y} + \frac{\cot y \; 1}{\tan x \cot y} =$$

$$\frac{1}{\cot y} + \frac{1}{\tan x} =$$

$$\boxed{\tan y + \cot x = \tan y + \cot x}$$

Verify:

$$\tan^2 \theta + 5 = \sec^2 \theta + 4$$

$\underline{\tan^2 \theta + 1} + 4 =$

$\sec^2 \theta + 4 =$

$= \tan^2 \theta + 1 + 4$

$= \tan^2 \theta + 5$

Verify:

$$\sec^6 x \, (\sec x \tan x) - \sec^4 x (\sec x \tan x) = \sec^5 x \tan^3 x$$

$$\sec^7 x \tan x - \sec^5 x \tan x =$$

$$\sec^5 x \tan x \left(\underbrace{\sec^2 x - 1}_{} \right) =$$

$$\sec^5 x \tan x \, \tan^2 x =$$

$$\boxed{\sec^5 x \tan^3 x = \sec^5 x \tan^3 x}$$

Verify:

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

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

$$\frac{(\csc x - 1)(\csc x + 1)}{1 + \csc x} = \csc x - 1$$

$$\boxed{\csc x - 1 = \csc x - 1}$$