Verifying Trig Equations Notes

1. You may only work on one side of the identity. As a general rule, you should choose to work on the more complex side. ★

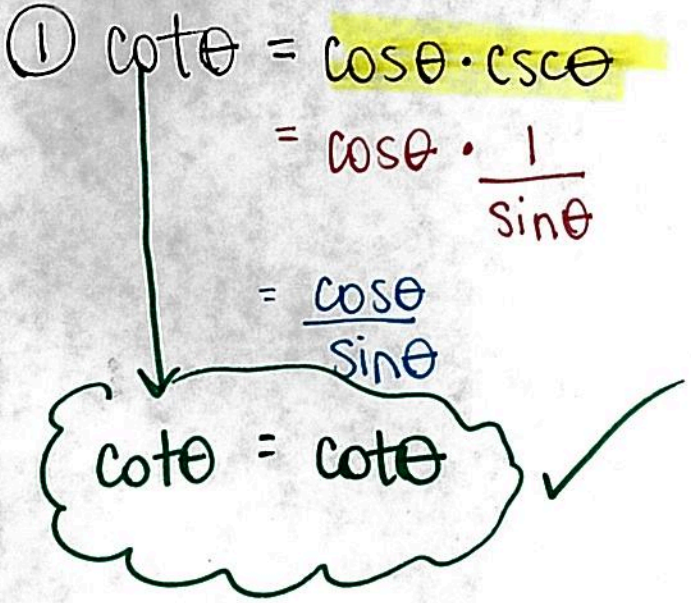
2. Perform algebraic operations:
   a) Factor
   b) Simplify
   c) Combine fractions
   d) Combine like terms
   e) Multiply numerator and denominator by the same expression
   f) Add and subtract equal values to obtain an equivalent expression

3. Use trig identities:
   d) Know your identities and look for ways to apply them
   e) If one side contains only one trig function, try to rewrite all functions on the other side in terms of that function
   ★ f) It may be helpful to rewrite all expressions in terms of sines and cosines

4. Continue until the side you are working on is identical to the other side.

5. As you work, keep in mind what you are working toward.

6. Remember: you must show all of your work and you must work down the page and keep the equal signs aligned.



② $2\sec^2\theta = \frac{1(1+\sin\theta)}{(1+\sin\theta)(1-\sin\theta)} + \frac{1(1-\sin\theta)}{1+\sin\theta(1-\sin\theta)}$

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

$= \frac{2}{\cos^2\theta} \rightarrow 2\left(\frac{1}{\cos^2\theta}\right)$

$2\sec^2\theta = 2\sec^2\theta$ ✓

③ $\frac{\tan x - \cot x}{\sin x \cos x} = \sec^2 x - \csc^2 x$

$\frac{\frac{\sin x}{\cos x}\left(\frac{\sin x}{\sin x}\right) - \frac{\cos x}{\sin x}\left(\frac{\cos x}{\cos x}\right)}{\sin x \cos x}$

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

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

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

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

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

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

$\sec^2 x - \csc^2 x = \sec^2 x - \csc^2 x$ ✓

④ $\frac{\sin x}{1-\cos x} \cdot \frac{\sin x}{\sin x} = \frac{\sin x}{1+\cos x}$

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

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

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

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

	1	sin x
1	1	sin x
sin x	sin x	$\sin^2 x$

⑤ $\frac{\cos^2 x}{1+2\sin x+\sin^2 x} = \frac{\sec x - \tan x}{\sec x + \tan x}$

$\frac{1-\sin^2 x}{(1+\sin x)(1+\sin x)}$

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

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

$\frac{\sec x - \tan x}{\sec x + \tan x} =$