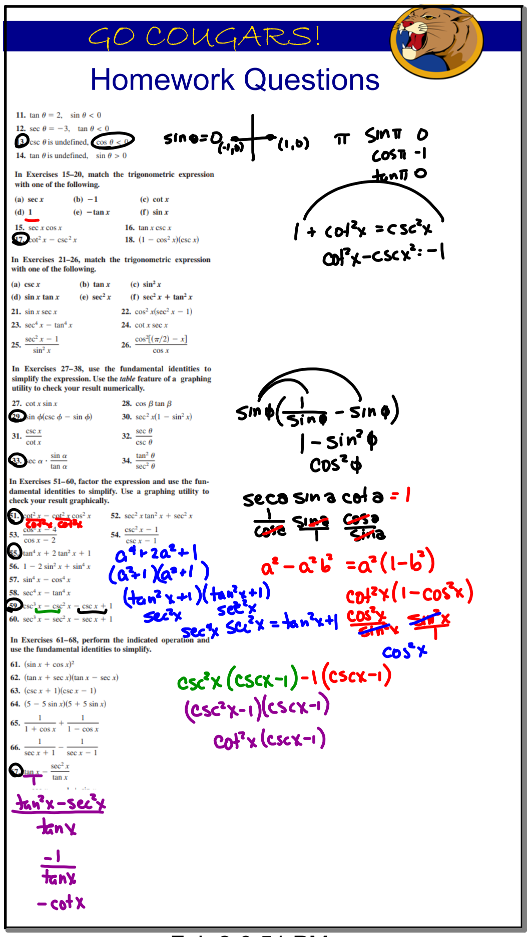

Feb 2-9:51 PM

5.2 Verifying Trig Identities

To make one side of the equation to look like the other.

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To Verify a Trig Identity you may work with one side of the equation only!!

Rules/Suggestions/Look Fors

1. $\sec y \cos y = 1$

LHS $\frac{1}{\cancel{\cos y}} \cdot \frac{\cancel{\cos y}}{1}$

$1 = 1$ ✓

reciprocals

2. $\frac{\sin^2 x}{\tan^2 x} = \cos^2 x$

LHS $\sin^2 x \cot^2 x$

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

$\cos^2 x = \cos^2 x$ ✓

reciprocal

quotient identity

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

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

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

$2\cos^2 x - 1 = 2\cos^2 x - 1$ ✓

Pythagorean Identity

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

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

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4. $(\sec\theta - \tan\theta)(\csc\theta + 1) = \cot\theta$

LHS $\left(\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\sin\theta} + 1\right)$

in terms sin/cos

$\rightarrow \left(\frac{1 - \sin\theta}{\cos\theta}\right)\left(\frac{1 + \sin\theta}{\sin\theta}\right)$

common denom

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

foiled

P.I

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

cancel

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

rewrite

$\cot\theta = \cot\theta$ ✓

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5. $$\frac{1+\cos\theta}{\sin\theta}+\frac{\sin\theta}{1+\cos\theta}=2\csc\theta$$

LHS $\dfrac{(1+\cos\theta)(1+\cos\theta)+\sin\theta(\sin\theta)}{\sin\theta(1+\cos\theta)}$ common denom

$\dfrac{1+2\cos\theta+\underbrace{\cos^2\theta+\sin^2\theta}_{1}}{\sin\theta(1+\cos\theta)}$ foil

$\dfrac{2+2\cos\theta}{\sin\theta(1+\cos\theta)}$ identity

$\dfrac{2(\cancel{1+\cos\theta})}{\sin\theta(\cancel{1+\cos\theta})}$ factor

cancel

$\dfrac{2}{\sin\theta}$ reciprocal

$2\csc\theta \quad = 2\csc\theta$ ✓

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6. $$\frac{\sin\beta}{1-\cos\beta}=\frac{1+\cos\beta}{\sin\beta}$$

mult by conjugate of denominator

$\dfrac{1+\cos\beta}{1+\cos\beta}\cdot\dfrac{\sin\beta}{1-\cos\beta}$

foil

$\dfrac{(1+\cos\beta)\sin\beta}{1-\cos^2\beta}$ P. I

$\dfrac{(1+\cos\beta)\cancel{\sin\beta}}{\sin^{\cancel{2}}\beta}$ cancel

$\dfrac{1+\cos\beta}{\sin\beta}$ ✓

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HOMEWORK

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1-9 odd, 39-45 odd, 48

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