Worksheet 7.2b

Verify that the following equations are identities by showing one step at a time.

1) $\frac{\tan\theta}{\sec\theta} = \sin\theta$

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

$\frac{\sin\theta}{\cos\theta} \cdot \frac{\cos\theta}{1}$

$\sin\theta = \sin\theta$ ☺

2) $\frac{\tan^2\beta + 1}{\sec\beta} = \sec\beta$

$\frac{\sec^2\beta}{\sec\beta}$

$\sec\beta = \sec\beta$ ☺

3) $\sin^2 x(1 + \cot^2 x) = 1$

$\sin^2 x \cdot \csc^2 x$

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

$1 = 1$ ☺

4) $\frac{\sin^2 A}{\cos A} = \sec A - \cos A$

$\frac{1 - \cos^2 A}{\cos A}$

$\frac{1}{\cos A} - \frac{\cos^2 A}{\cos A}$

$\sec A - \cos A = \sec A - \cos A$

☺

Name: _____ # ___

5) $sec^4x - sec^2x = tan^4x + tan^2x$

$sec^2x(sec^2x - 1)$

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

$tan^4x + tan^2x = tan^4x + tan^2x$

U

6) $(sec\beta - tan\beta)^2 = \frac{1 - sin\beta}{1 + sin\beta}$

$sec^2\beta - 2\,sec\beta\,tan\beta + tan^2\beta$

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

$\frac{1 - 2\,sin\beta + sin^2\beta}{cos^2\beta}$

$\frac{1 - 2\,sin\beta + sin^2\beta}{1 - sin^2\beta}$

$\frac{(1 - sin\beta)(1 - sin\beta)}{(1 - sin\beta)(1 + sin\beta)}$

$\frac{1 - sin\beta}{1 + sin\beta} = \frac{1 - sin\beta}{1 + sin\beta}$ U

7) $\frac{(sec\theta - tan\theta)^2 + 1}{sec\theta\,csc\theta - tan\theta csc\theta} = 2tan\theta$

$\frac{sec^2\theta - 2\,sec\theta\,tan\theta + tan^2\theta + 1}{csc\theta(sec\theta - tan\theta)}$

$\frac{sec^2\theta - 2\,sec\theta\,tan\theta + sec^2\theta}{csc\theta(sec\theta - tan\theta)}$

$\frac{2sec^2\theta - 2sec\theta\,tan\theta}{csc\theta(sec\theta - tan\theta)}$

$\frac{2sec\theta(sec\theta - tan\theta)}{csc\theta(sec\theta - tan\theta)}$

$\frac{2\,sec\theta}{csc\theta} \Rightarrow \frac{2\frac{1}{cos\theta}}{\frac{1}{sin\theta}}$

$2\frac{sin\theta}{cos\theta} \Rightarrow 2\,tan\theta = 2\,tan\theta$

U

8) $\frac{sin^4x - cos^4x}{sin^2x - cos^2x} = 1$

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

$sin^2x + cos^2x$

$1 = 1$ U