Name: Key

5.2 EXTRA

1) $\tan^4 x = \tan^2 x \sec^2 x - \tan^2 x$ Factor!

EASY

$= \tan^2 x(\sec^2 x - 1)$

$= \tan^2 x(\tan^2 x)$

$\tan^4 x \overset{\checkmark}{=} \tan^4 x$

$+\tan^2 x = \sec^2 x$ -1

$\tan^2 x = \sec^2 x - 1$

★ I also saw.....

$= \tan^2(1 + \tan^2 x) - \tan^2 x$ since $1+\tan^2 x = \sec^2 x$

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

$\tan^4 x \overset{\checkmark}{=} \tan^4 x$

2) $(\tan^2 x + 1)(\cos^2 x - 1) = -\tan^2 x$

MEDIUM

$(\sec^2 x)(-\sin^2 x)$

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

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

$-\tan^2 x \overset{\checkmark}{=} -\tan^2 x$

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

$\cos^2 x + \sin^2 x - 1 = 0$ $-\sin^2 x$ $-\sin^2 x$

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

Name: _____

5.2 EXTRA

1) $\tan^4 x = \tan^2 x \sec^2 x - \tan^2 x$

sines + cosines approach

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

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

$= \frac{\sin^2 x - \sin^2 x \cdot \cos^2 x}{\cos^4 x}$

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

$= \frac{\sin^2 x(\sin^2 x)}{\cos^4 x}$

$= \frac{\sin^4 x}{\cos^4 x}$ $\tan^4 x \overset{\checkmark}{=} \tan^4 x$

2) $(\tan^2 x + 1)(\cos^2 x - 1) = -\tan^2 x$

I also saw...

$(\sec^2 x)(\cos^2 x - 1) =$

$\sec^2 x \cdot \cos^2 x - \sec^2 x =$

$1 - \sec^2 x =$

$-\tan^2 x \overset{\checkmark}{=} -\tan^2 x$

$1 + \tan^2 x = \sec^2 x$ $-\sec^2 x$ $-\sec^2 x$

$1 + \tan^2 x - \sec^2 x = 0$ $-\tan^2 x$ $-\tan^2 x$

$1 - \sec^2 x = -\tan^2 x$

Working the right side ...

3) $\dfrac{1}{\csc x \cot x} = \sec x - \cos x$

HARD

$= \dfrac{1}{\cos x} - \dfrac{\cos x}{1}\cdot\dfrac{(\cos x)}{(\cos x)}$

$= \dfrac{1-\cos^2 x}{\cos x}$

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

$= \dfrac{\sin x}{\cos x} \cdot \dfrac{\sin x}{1}$

$= \dfrac{\tan x}{1} \cdot \dfrac{\sin x}{1}$

$= \dfrac{1}{\cot x} \cdot \dfrac{1}{\csc x}$

$\dfrac{1}{\csc x \cdot \cot x} \overset{\checkmark}{=} \dfrac{1}{\csc x \cdot \cot x}$

4) $\sec\theta = \dfrac{\sec\theta - 1}{1-\cos\theta}\cdot\dfrac{(1+\cos\theta)}{(1+\cos\theta)}$

NINJA

$\dfrac{\sec\theta + \cos\theta\sec\theta - 1 - \cos\theta}{1-\cos^2\theta}$ (1)

$\dfrac{\sec\theta + 1 - 1 - \cos\theta}{1-\cos^2\theta}$

$\dfrac{\sec\theta - \cos\theta}{1-\cos^2\theta}$ common denom for numerator!

$\dfrac{\frac{1}{\cos\theta} - \frac{\cos\theta}{1}\cdot\frac{(\cos\theta)}{(\cos\theta)}}{1-\cos^2\theta}$

$\dfrac{\frac{1-\cos^2\theta}{\cos\theta}}{1-\cos^2\theta}$ *

$\dfrac{1-\cos^2\theta}{\cos\theta}\cdot\dfrac{1}{1-\cos^2\theta}$

Remember...

$\dfrac{\frac{1}{3}}{3} = \dfrac{1}{3}\cdot\dfrac{1}{3}$

$\dfrac{1}{\cos\theta}$

$\sec\theta \overset{\checkmark}{=} \sec\theta$

Working the left

3) $\dfrac{1}{\csc x \cot x} = \sec x - \cos x$

$\sin x \cdot \dfrac{\sin x}{\cos x} =$

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

Identity $\dfrac{(1-\cos^2 x)}{\cos x} =$

$\dfrac{1}{\cos x} - \dfrac{\cos^2 x}{\cos x} =$

$\sec x - \dfrac{\cos x \cdot \cos x}{\cos x} =$

$\sec x - \cos x \overset{\checkmark}{=} \sec x - \cos x$

4) $\sec\theta = \dfrac{\sec\theta - 1}{1-\cos\theta}$ I also saw...

$= \dfrac{\sec\theta - 1}{\frac{(\sec\theta)}{(\sec\theta)} - \frac{1}{\sec\theta}}$

$= \dfrac{\sec\theta - 1}{\frac{\sec\theta - 1}{\sec\theta}}$

Think...

$\dfrac{4}{\frac{3}{4}}$

$4\cdot\dfrac{4}{3}$

$= \dfrac{\sec\theta - 1}{1}\cdot\dfrac{\sec\theta}{\sec\theta - 1}$

$\sec\theta \overset{\checkmark}{=} \sec\theta$