Section 5.2 Day 1 Proving trig identities.

Ex 1: Prove the following identities

$\underbrace{\cot + \tan}_{\text{Side 1}} \overset{\text{as given}}{=} \underbrace{\sec \csc}_{\text{Side 2}}$ how?

- Side 1 → manipulate side 1 using trig identities → until side 2 shows up.

$$\cot + \tan = \frac{\cos}{\sin}\cdot\frac{\cos}{\cos} + \frac{\sin}{\cos}\cdot\frac{\sin}{\sin}$$

$$= \frac{\cos^2}{\sin\cos} + \frac{\sin^2}{\cos\sin}$$ ↙ common denominator

$$= \frac{\cos^2 + \sin^2}{\sin\cos}$$

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

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

$$= \csc\cdot\sec$$

$$= \sec\cdot\csc$$ ✓ Proved.

Ex2 $\dfrac{1}{\sec x - 1} + \dfrac{1}{\sec x + 1} = 2\csc\cot$

$(\sec x+1)$ $(\sec -1)$

$(\sec x+1)\cdot(\sec x-1)$ — special case $(a+b)(a-b) = a^2-b^2$

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

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

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

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

$= \dfrac{2\sec x}{\tan^2 x}$

$= 2\sec x \cdot \dfrac{1}{\tan^2 x}$

$= 2 \cdot \dfrac{1}{\cos} \cdot \cot^2$

$= 2 \cdot \dfrac{1}{\cos} \cdot \dfrac{\cos^2}{\sin^2}$

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

$= 2 \cdot \dfrac{\cos}{\sin} \cdot \dfrac{1}{\sin}$

$= 2\cot\cdot\csc$

$= 2\csc\cot$ ✓ Proved.

Pair work p 418 # 11 - 18