5-2-2 Verifying Identities

Ex 3 Verify by using the conjugate to eliminate a fraction.

Verify $\frac{\sin x}{1-\cos x} = \csc x + \cot x$

conjugates

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

$1^2 - \cos^2 x$

$\sin^2\theta$

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

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

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

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

$$\csc x + \cot x = \csc x + \cot x \checkmark$$

problems with powers or multiple terms, try factoring.

factoring Review				
	$AB + AC$	$1 - x^2$	$x^2 - 1$	$(A+B)^2$
	$A(B+C)$	$(1+x)(1-x)$	$(x+1)(x-1)$	$A^2 + 2AB + B^2$

Ex 4 Verify by factoring

$\cot\theta \sec\theta \csc^2\theta - \cot^3\theta \sec\theta = \csc\theta$

$\cot\theta \sec\theta (\csc^2\theta - \cot^2\theta) =$

$\csc^2\theta - \cot^2\theta = 1$

$\cot^2 + 1 = \csc^2$

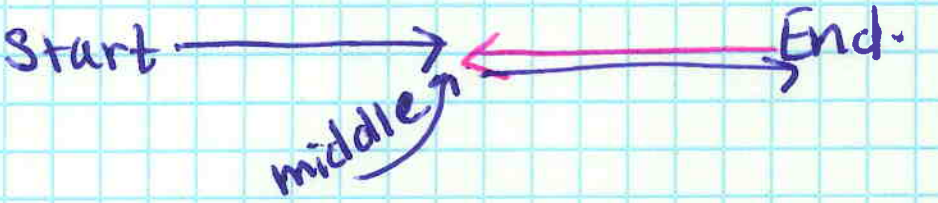
$-\cot^2 \quad -\cot^2$

$1 =$

$\cot\theta \sec\theta =$

$\frac{\cos\theta}{\sin\theta} \cdot \frac{1}{\cos\theta} = \csc\theta = \csc\theta$ ✓

Ex 5 Work both sides <u>Independently</u> and meet in the middle.



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

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

factor

$$\frac{\sec^2 x - 1}{1+\sec x}$$

$$\frac{(\sec x+1)(\sec x-1)}{(1+\sec x)}$$

$$(\sec x - 1)$$

"middle"

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

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

$$\sec x - 1$$

$$\frac{1-\cos x}{\cos x} = \frac{1-\cos x}{\cos x} \quad \checkmark$$

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