More Fun with Fundamental Identities

Tips

1) If in doubt, change everything to sines & cosines.

2) Use identities which make terms cancel.

3) If fractions are added or subtracted, make common denominators.

4) Change both sides to the same trig functions, so you can see what you are trying to equal.

5) If you need an expression to contain squared terms, try multiplying by the conjugate.

6) If terms have powers > 2, try to factor.

$$\frac{\cos^2 x + 3\sin x - 1}{3 + 2\sin x - \sin^2 x} = \frac{1}{1 + \csc x}$$

$$\frac{\overset{3\sin x - \sin^2 x}{\cancel{1} - \sin^2 x + 3\sin x - \cancel{1}}}{3 + 2\sin x - \sin^2 x} = \frac{1}{\frac{\sin x}{\sin x} + \frac{1}{\sin x}}$$

$$\frac{\sin x\,\cancel{(3 - \sin x)}}{(1 + \sin x)\cancel{(3 - \sin x)}} = \frac{1}{\frac{\sin x + 1}{\sin x}}$$

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

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

$$\frac{1 \cdot 3}{2 \cdot 3}$$

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

Calculator: Is this an identity?

$$\underbrace{\frac{\cot x}{\cos x} - \frac{\csc^2 x}{\sec x}}_{f_1} = \underbrace{\frac{\sin x - \cos x}{\sin^2 x}}_{f_2}$$

= yes, it is an identity

1