

Identities:

Pick one side and turn it into the other. Turn the complex side into the simple side.

Always my first step:

- Switch everything to sines and cosines.

Usually:

- If anything is a fraction, use common denominators to make one fraction.

Helpful:

- If anything is squared  $\sin^2 x + \cos^2 x = 1$  is in your future

- If there are negative signs on the angles, use negative identities

- Do not avoid distributing and expanding expressions no matter how complex and ugly.

- If there are fractions and you see how to turn either top or bottom into something you want by multiplication, then multiply both numerator and denominator by that value.

Big trick: Conjugate/difference of squares

-  $1 - \sin^2 \theta = (1 - \sin \theta)(1 + \sin \theta) = \cos^2 \theta$

- Multiply by the conjugate

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