

## 6.3 Proving Identities

Splitting 2 into 1+1

Write everything in terms of  $\sin x$  &  $\cos x$

Factor or Expand

Use the identities to make replacements

Multiply by conjugate

Create common denominators

Cancel carefully

$$(x+y)^2 = x^2 + 2xy + y^2$$

Look at the answer

Ex) Prove  $1 - \sin^2 x = \sin x \cdot \cos x \cdot \cot x$

1. Pick one side to manipulate. Leave the other side alone. Usually work with the more complex side.

RS

$$\sin x \cdot \cos x \cdot \cot x$$

$$\frac{\cancel{\sin x} \cdot \cos x \cdot \cos x}{\cancel{\sin x}}$$

$$\cos^2 x$$

$$1 - \sin^2 x$$

$$RS = LS$$

Q.E.D.

LS  
 $\cos^2 x$

Ex) Prove  $\tan x = \frac{1 - \cos 2x}{\sin 2x}$       LS  
 $\tan x = \frac{\sin x}{\cos x}$

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

$\frac{2\sin x \cdot \sin x}{2\sin x \cdot \cos x}$

$\tan x$     LS = RS    QED

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

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

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

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

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

LS = RS    QED

Ex)  $\cos^2 x - \cos x - 2$       Factor  
 $A^2 - A - 2$   
 $(\cos x + 1)(\cos x - 2)$

Pg. 314-315

#1-8, 10, 11, 15