

Unit 7: Proofs

prove

$$1 - 2 \sin^2 x = 2 \cos^2 x - 1$$

To prove, take the L.S. and rewrite it until you get the R.S. (by using identities).


Statements	Justification
L.S.	
$1 - 2 \sin^2 x$	<ul style="list-style-type: none"> make it ready for substitution. $\sin^2 x + \cos^2 x = 1$ $\sin^2 x = 1 - \cos^2 x$ substitution Strategies: trail and Error pick a trig identity that has what you have (sin) and ideally what you want (cos) or what will lead you to it evaluate, simplify and manipulate till you get the other side.
$1 - 2(1 - \cos^2 x)$	
$1 - 2 + 2 \cos^2 x$	
$-1 + 2 \cos^2 x$	
$2 \cos^2 x - 1$	
R.S.	
□	

Prove
 $\sec^4 x - \sec^2 x = \tan^2 x + \tan^4 x$

Statements	Justifications

Prove

$$\cot x + \tan x = \cot x \sec^2 x$$

Statements	Justifications
L.S.	Strategy if L.S. has 2 terms and R.S. has one term, add the terms.
$\cot x + \tan x$	• $\cot x = \frac{1}{\tan x}$
$\frac{1}{\tan x} + \frac{\tan x \cdot \tan x}{1 + \tan x}$	• added fractions. $\tan^2 x + 1 = \sec^2 x$ $1 + \tan^2 x = \sec^2 x$
$\frac{1 + \tan^2 x}{\tan x}$	$\cot x = \frac{1}{\tan x}$
$\frac{\sec^2 x}{\tan x}$	
$\frac{1}{\tan x} \cdot \sec^2 x$	
$\cot x \cdot \sec^2 x$	
R.S. 	

Prove that

$$\tan x + \cot x = \sec x \cdot \csc x$$

L.S.

$$\tan x + \cot x$$

$$\frac{\tan x}{\tan x} + \frac{1}{\tan x}$$

$$\frac{\tan^2 x + 1}{\tan x}$$

$$\frac{\sec^2 x}{\tan x}$$

$$\frac{\sec x \cdot \sec x}{\tan x}$$

$$\sec x \cdot \frac{1}{\frac{\cos x}{\sin x}}$$

$$\sec x \cdot \frac{1}{\cos x} \times \frac{\cos x}{\sin x}$$

$$\sec x \cdot \frac{1}{\sin x}$$

$$\sec x \cdot \csc x$$

R.S.

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

get rid of sec². (only way by canceling out)

$$\sec x = \frac{1}{\cos x} \quad \left| \quad \tan x = \frac{\sin x}{\cos x} \right.$$

$$\csc x = \frac{1}{\sin x} \quad \text{p 7.15}$$

Prove #7 on 7.19

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

Tips on

pg 7.15

