Lesson 6.3: Proving Identities

Simplify both sides of the identity
into identical expressions

(i.e., Left Hand Side = Right Hand Side)

Strategies

(i) write expression in terms of sine and cosine

(ii) complete an algebraic operation

factor the expression;
determine common denominator;
multiply by the conjugate

(iii) Substitute in Trigonometric Identities

reciprocal identities
pythagorean identities
sum and difference identities
double angle identities

Proving Identities

Example 1: $\cos x + \cos x \tan^2 x = \sec x$

Example 2: $\dfrac{\cos^2 x - \sin^2 x}{\cos^2 x + \sin x \cos x} = \dfrac{\cot x - 1}{\cot x}$

Example 3 : $\dfrac{\tan^2 x - 3\tan x - 4}{\sin x \tan x + \sin x} = \sec x - 4\csc x$

Example 4: $\dfrac{\sin 2x - \cos x}{4\sin^2 x - 1} = \dfrac{\sin^2 x \cos x + \cos^3 x}{2\sin x + 1}$

Example 5: $\dfrac{2(\tan x - \cot x)}{\tan^2 x - \cot^2 x} = \sin 2x$

Example 6: $\cot x - \csc x = \dfrac{\cos 2x - \cos x}{\sin 2x + \sin x}$

Example 7: $(1+\cot^2 x)(1-\cos 2x)=2$

Example 8: $1+\sin 2x=(\sin x+\cos x)^2$

Example 9: $\dfrac{\tan x}{1+\sec x}+\dfrac{1+\sec x}{\tan x}=2\csc x$

Example 10: $\dfrac{1-\cos 2x+\sin 2x}{1+\cos 2x+\sin 2x}=\tan x$

Example 11: $\sin 3x = 3\sin x - 4\sin^3 x$

Example 12: $\sec x + \tan x = \dfrac{\cos x}{1 - \sin x}$

Assign p.314-315 #1abd, 2, 7, 8, 11, 15, 18