Calculus 12
10-5 Trigonometric Identities

1. Use the reciprocal, quotient, and/or Pythagorean relationships to prove each.

a) $\sin x \tan x = \sec x - \cos x$

b) $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$

c) $\dfrac{\tan x + \tan y}{\cot x + \cot y} = (\tan x)(\tan y)$

2. Use the addition and subtraction formulas to prove each.

a) $\cos(x + y)\cos y + \sin(x + y)\sin y = \cos x$

b) $\cos\left(\dfrac{3\pi}{4} + x\right) + \sin\left(\dfrac{3\pi}{4} - x\right) = 0$

c) $\sin(x + y)\sin(x - y) = \cos^2 y - \cos^2 x$

3. Use the related and co-related angles to prove each.

a) $\sin\left(\dfrac{\pi}{2} - x\right)\cot\left(\dfrac{\pi}{2} + x\right) = -\sin x$

b) $\cos(-x) + \cos(\pi - x) = \cos(\pi + x) + \cos x$

4. Use the double angle formulas to prove each.

a) $\dfrac{\sin 2x}{1 + \cos 2x} = \tan x$

b) $2\csc 2x = \sec x \csc x$

c) $2\cot 2x = \cot x - \tan x$

5. Use appropriate formulas and identities to prove each.

a) $\cos x = \sin x \tan^2 x \cot^3 x$

b) $(\sin x + \cos x)(\tan x + \cot x) = \sec x + \csc x$