4.4 Proving Trigonometric Identities Day 2

example: Prove

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

$RS = \sin x\cos y + \cancel{\sin y\cos x} + \sin x\cos y - \cancel{\sin y\cos x}$

$= 2\sin x\cos y$

$\because LS = RS$

$\therefore$ QED

b) $\dfrac{\cos(x-y)}{\cos x \bullet \sin y} = \cot y + \tan x$

$LS = \dfrac{\cos x\cos y + \sin x\sin y}{\cos x\sin y}$

$RS = \dfrac{\cos y}{\sin y} + \dfrac{\sin x}{\cos x}$

$= \dfrac{\cos x\cos y + \sin x\sin y}{\sin y\cos x}$

$\because LS = RS$

$\therefore$ QED

c) $\sin(a+b)\bullet\sin(a-b)=\cos^2 b-\cos^2 a$

$LS=(\sin a\cos b+\sin b\cos a)(\sin a\cos b-\sin b\cos a)$

$=(ad+bc)(ad-bc)$ DIFFERENCE OF SQUARES

$a=\sin a$, $b=\sin b$, $c=\cos a$, $d=\cos b$

$=\sin^2 a\cos^2 b-\sin^2 b\cos^2 a$

$=(1-\cos^2 a)\cos^2 b-(1-\cos^2 b)\cos^2 a$

$=\cos^2 b-\cancel{\cos^2 a\cos^2 b}-\cos^2 a+\cancel{\cos^2 a\cos^2 b}$

$=\cos^2 b-\cos^2 a$

$\because LS=RS$

$\therefore$ QED

d) $\dfrac{\tan(a-b)+\tan b}{1-\tan(a-b)\tan b}=\tan a$

$\dfrac{\tan x+\tan y}{1-\tan x\tan y}$

$=\tan(x+y)$

$=\tan(a-b+b)$

$=\tan(a)$

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

DO NOT USE DOUBLE ANGLE FORMULAS

$LS=\cos 2x$

$=\cos(x+x)$

$=\cos x\cos x-\sin x\sin x$

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

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

$=1-2\sin^2 x$

$\because LS=RS$

$\therefore$ QED

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Are you having an IDENTITY CRISIS?

Homework 4.4

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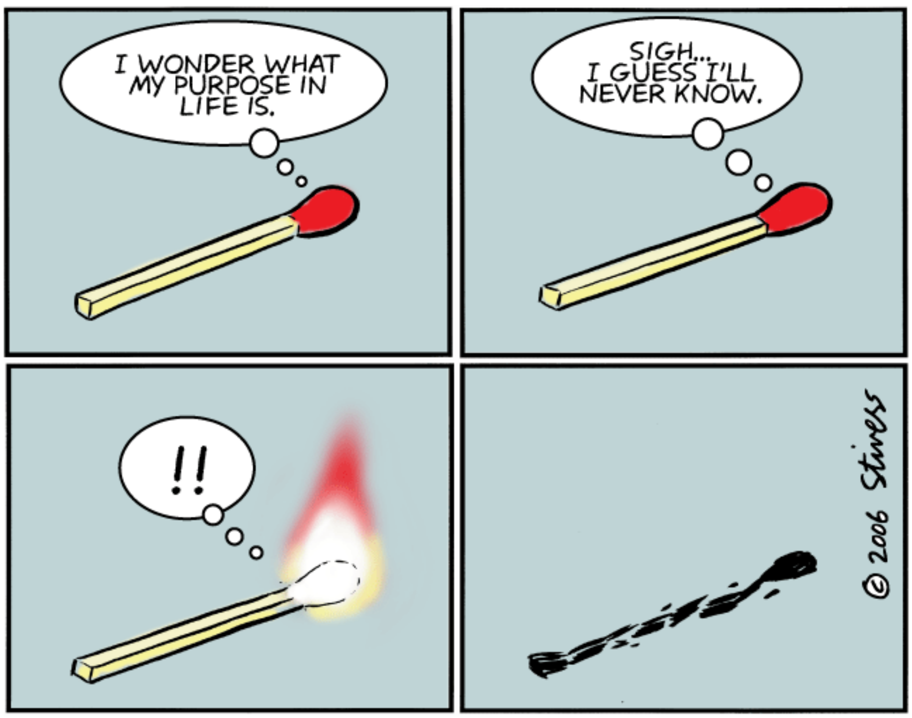
Handout #10-12



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