"Tricks"

① Factor (-1)

$$\frac{\sin^2\theta - 1}{\cos^2\theta}$$

$$= -\frac{(1 - \sin^2\theta)}{\cos^2\theta}$$

$$= -\frac{\cancel{\cos^2\theta}}{\cancel{\cos^2\theta}}$$

② Factor $1 - \cos^2 x$

$$= (1 + \cos x)(1 - \cos x)$$

③ $\sin^3\theta = \sin\theta(\sin^2\theta)$

Perfect Square.

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

Difference of Squares

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

Difference of Squares ~~on steroids~~ "pumped up"

④ $\cos^4\theta - \sin^4\theta$

$$= (\cos^2\theta - \sin^2\theta)(\cos^2\theta + \sin^2\theta)$$

$$= (\cos^2\theta - \sin^2\theta)(1)$$

$$= \cos^2\theta - (1 - \cos^2\theta)$$

$$= 2\cos^2\theta - 1$$

⑤ Common Denominator

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

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

a) $1-\sin^2 x=\dfrac{\sin^2 x}{\tan^2 x}$

a.) $1-\sin^2 x = \dfrac{\sin^2 x}{\tan^2 x}$

LS	RS
$1-\sin^2 x$	$=\dfrac{\sin^2 x}{\dfrac{\sin^2 x}{\cos^2 x}}$
$=\cos^2 x$	$=\cancel{\sin^2 x}\cdot\dfrac{\cos^2 x}{\cancel{\sin^2 x}}$
	$=\cos^2 x$

LS = RS

b) $$\frac{\sin^2 x - \cos^2 x}{\sin x - \cos x} = \sin x \cos x\left(\frac{1}{\sin x} + \frac{1}{\cos x}\right)$$

b.) $$\frac{\sin^2 x - \cos^2 x}{\sin x - \cos x}$$

$$= \frac{(\sin x + \cos x)\cancel{(\sin x - \cos x)}}{\cancel{\sin x - \cos x}}$$

$$= \sin x + \cos x$$

$$\sin x \cos x\left(\frac{1}{\sin x} + \frac{1}{\cos x}\right)$$

$$= \cancel{\sin x \cos x}\left(\frac{\cos x + \sin x}{\cancel{\sin x \cos x}}\right)$$

$$= \cos x + \sin x$$

LS = RS

c) $\dfrac{\sin x}{1-\cos x}-\dfrac{1}{\tan x}=\dfrac{1}{\sin x}$

c.) $\dfrac{\sin x}{1-\cos x}-\dfrac{1}{\tan x}$ | $\dfrac{1}{\sin x}$

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

$=\dfrac{\sin x}{1-\cos x}-\dfrac{\cos x}{\sin x}$

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

$=\dfrac{\overbrace{\sin^2 x+\cos^2 x}^{=1}-\cos x}{(1-\cos x)(\sin x)}$

$=\dfrac{\cancel{1-\cos x}}{(\cancel{1-\cos x})(\sin x)}$

$=\dfrac{1}{\sin x}$

d) $\sin^2 x + \tan^2 x = \sec^2 x - \cos^2 x$

d.)

$$\sin^2 x + \tan^2 x$$

$$= \sin^2 x + \frac{\sin^2 x}{\cos^2 x}$$

$$= \frac{\sin^2 x \cos^2 x + \sin^2 x}{\cos^2 x}$$

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

$$\sec^2 x - \cos^2 x$$

$$= \frac{1}{\cos^2 x} - \cos^2 x$$

$$= \frac{1 - \cos^4 x}{\cos^2 x}$$

$$= \frac{\left(1 + \cos^2 x\right)\left(1 - \cos^2 x\right)}{\cos^2 x}$$

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

LS = RS

e) $\dfrac{\cos x}{1-\sin x} - \sec x = \tan x$

e) $\dfrac{\cos x}{1 - \sin x} - \sec x$ $\qquad$ $\tan x$

$= \dfrac{\cos x}{1 - \sin x} - \dfrac{1}{\cos x}$ $\qquad$ $= \dfrac{\sin x}{\cos x}$

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

$= \dfrac{-1(\overbrace{-\cos^2 x + 1}^{\sin^2 x} - \sin x)}{(1 - \sin x)(\cos x)}$

$= \dfrac{-1(\sin^2 x - \sin x)}{(1 - \sin x)(\cos x)}$

$= \dfrac{-1(\sin x)(\sin x - 1)}{(1 - \sin x)(\cos x)}$

$= \dfrac{\sin x\,\cancel{(-\sin x + 1)}}{\cancel{(1 - \sin x)}(\cos x)}$

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

$\therefore LS = RS$

Homework

Pg. 310 # 10, 11, 12

Attachments

sinusoidal transformations.pptx