5-4-2 Cofunction & Reduction Identities

* Cofunction identity add/subtract 90° to get a different trig function $\sin(x-90) = \cos x$

* Reduction identity simplifies a trig expression by adding multiples of 90°.

Ex 5 Verify a Cofunction

Verify $\sin\left(\frac{\pi}{2} - x\right) = \cos x$

$\sin - \quad \sin\alpha\cos\beta - \cos\alpha\sin\beta$

$\sin\frac{\pi}{2}\cos x - \cos\frac{\pi}{2}\sin x =$

evaluate known angles

$(1)\cos x - (0)\sin x =$

$\cos x = \cos x \therefore$

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

$\cos - \quad \cos\alpha\cos\beta + \sin\alpha\sin\beta$

$\cos\frac{\pi}{2}\cos x + \sin\frac{\pi}{2}\sin x$

$(0)\cos x + 1\sin x$

$\sin x = \sin x \therefore$

Ex 6 a) Verify Reduction Identity

a) $\sin\left(\theta + \frac{3\pi}{2}\right) = -\cos\theta$

sin+
sαcβ+cαsβ

(0,-1)

$\sin\theta\cos\frac{3\pi}{2} + \cos\theta\sin\frac{3\pi}{2} =$

$\sin\theta\,(0) + \cos\theta\,(-1) =$

$-\cos\theta = -\cos\theta \;\therefore$

b) $\tan(x - 180°) = \tan x$

tan −

$\frac{\tan x - \tan 180}{1 + \tan x \tan 180}$

$\frac{t\alpha - t\beta}{1 + t\alpha\, t\beta}$

$\frac{\tan x - 0}{1 + \tan x\,(0)}$

$\frac{\tan x}{1} = \tan x \;\therefore$

341: 4, 5, 15, 20, 21, 33, 36-38

* #33 hint convert to $\frac{1}{\cos(\alpha+\beta)}$