Thursday

$\frac{d}{dx}(\sin x) = \cos x$

$\frac{d}{dx}(\cos x) = -\sin x$

$\frac{d}{dx}(\tan x) = \sec^2 x$

$\frac{d}{dx}(\sec x) = \sec x \cdot \tan x$

$\frac{d}{dx}(\cot x) = -\operatorname{cosec}^2 x$

$\frac{d}{dx}(\operatorname{cosec} x) = -\operatorname{cosec} x \cot x$

Ex:- Find $\frac{dy}{dx}$ for the following functions

1) $y = \sin 3x \cdot \cos 2x$

$\therefore \frac{dy}{dx} = \frac{d}{dx}[\sin 3x \cdot \cos 2x]$

$= \sin 3x \frac{d}{dx} \cos 2x + \cos 2x \frac{d}{dx} \sin 3x$

$= \sin 3x \cdot (-\sin 2x) \cdot \frac{d}{dx}(2x)$

$+ \cos 2x \cdot (\cos 3x) \cdot \frac{d}{dx}(3x)$

$= -2 \sin 3x (\sin 2x) + 3 \cos 2x \cdot \cos 3x$

2) $\sin^2 x \quad \therefore y = \sin^2 x = (\sin x)^2$

Let $u = \sin x$

$\therefore y = u^2$

$\therefore \frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$

$= \frac{d}{du}(u^2) \cdot \frac{d}{dx}(\sin x)$

$= 2u \cdot [\cos x]$

$= 2(\sin x) \cdot \cos x$

Genius is one percent inspiration and ninety-nine

3) $y = \log \sin x$

Let $u = \sin x$

$\therefore y = \log u$

$\therefore \frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$

$= \frac{d}{du}(\log u) \cdot \frac{d}{dx}(\sin x)$

$= \frac{1}{u} \cdot \cos x$

$= \frac{1}{\sin x} \cdot \cos x$

4) $y = e^{\cos x}$

5) $y = \sqrt{1 + \tan x}$

6) $y = \operatorname{cosec}(2^x)$