## Differentiation Ex 11.2 Q1

Let,

$$y = \sin(3x+5)$$

Differentiate $y$ with respect to $x$,

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx}\left(\sin(3x+5)\right)\\ &= \cos(3x+5)\frac{d}{dx}(3x+5) && \text{[using chain rule]}\\ &= \cos(3x+5)\times\left[3(1)+0\right]\\ &= 3\cos(3x+5)\end{aligned}$$

So,

$$\frac{d}{dx}\left(\sin(3x+5)\right) = 3\cos(3x+5).$$

## Differentiation Ex 11.2 Q2

Let,

$$y = \tan^2 x$$

Differentiate it with respect to $x$,

$$\begin{aligned}\frac{dy}{dx} &= 2\tan x\frac{d}{dx}(\tan x) && \text{[using chain rule]}\\ &= 2\tan x\times\sec^2 x\end{aligned}$$

So,

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

## Differentiation Ex 11.2 Q3

Let,

$$\begin{aligned}y &= \tan(x^\circ+45^\circ)\\ y &= \tan\left\{(x^\circ+45^\circ)\frac{\pi}{180^\circ}\right\}\end{aligned}$$

Differentiate it with respect to $x$,

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx}\tan\left\{(x^\circ+45^\circ)\frac{\pi}{180^\circ}\right\}\\ &= \sec^2\left\{(x^\circ+45^\circ)\frac{\pi}{180^\circ}\right\}\times\frac{d}{dx}(x^\circ+45^\circ)\frac{\pi}{180^\circ} && \text{[Using chain rule]}\\ &= \frac{\pi}{180^\circ}\sec^2(x^\circ+45^\circ)\end{aligned}$$

So,

$$\frac{d}{dx} = \left(\tan(x^\circ+45^\circ)\right) = \frac{\pi}{180^\circ}\sec^2(x^\circ+45^\circ).$$

## Differentiation Ex 11.2 Q4

Let,

$$y = \sin(\log x)$$

Differentiate it with respect to $x$,

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

$$= \cos(\log x)\frac{d}{dx}(\log x) \qquad \text{[Using chain rule]}$$

$$= \frac{1}{x}\cos(\log x)$$

So,

$$\frac{d}{dx} = \left(\sin(\log x)\right) = \frac{1}{x}\cos(\log x).$$

## Differentiation Ex 11.2 Q5

Let,

$$y = e^{\sin\sqrt{x}}$$

Differentiate it with respect to $x$,

$$\frac{dy}{dx} = \frac{d}{dx}\left(e^{\sin\sqrt{x}}\right)$$

$$= e^{\sin\sqrt{x}}\frac{d}{dx}\left(\sin\sqrt{x}\right) \qquad \text{[Using chain rule]}$$

$$= e^{\sin\sqrt{x}} \times \cos\sqrt{x}\,\frac{d}{dx}\sqrt{x} \qquad \text{[Using chain rule]}$$

$$= e^{\sin\sqrt{x}} \times \cos\sqrt{x} \times \frac{1}{2\sqrt{x}}$$

$$= \frac{1}{2\sqrt{x}}\cos\sqrt{x} \times e^{\sin\sqrt{x}}$$

So,

$$\frac{d}{dx} = \left(e^{\sin\sqrt{x}}\right) = \frac{1}{2\sqrt{x}}\cos\sqrt{x} \times e^{\sin\sqrt{x}}.$$

*********** END **********