



Differentiation Ex 11.2 Q1

Let,

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

Differentiate y with respect to x ,

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

So,

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

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,

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

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,

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

Differentiation Ex 11.2 Q4

Let,

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

Differentiate it with respect to x ,

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx} \sin(\log x) \\ &= \cos(\log x) \frac{d}{dx} (\log x) && \text{[Using chain rule]} \\ &= \frac{1}{x} \cos(\log x)\end{aligned}$$

So,

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

Differentiation Ex 11.2 Q5

Let,

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

Differentiate it with respect to x ,

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx} (e^{\sin \sqrt{x}}) \\ &= e^{\sin \sqrt{x}} \frac{d}{dx} (\sin \sqrt{x}) && \text{[Using chain rule]} \\ &= e^{\sin \sqrt{x}} \times \cos \sqrt{x} \frac{d}{dx} \sqrt{x} && \text{[Using chain rule]} \\ &= e^{\sin \sqrt{x}} \times \cos \sqrt{x} \times \frac{1}{2\sqrt{x}} \\ &= \frac{1}{2\sqrt{x}} \cos \sqrt{x} \times e^{\sin \sqrt{x}}\end{aligned}$$

So,

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

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