

## DIFFERENTIATION

### GROUP (A) – CLASS WORK PROBLEMS

**Q-1) If  $y = (x^2 + 1)^5 \cdot \sin 4x$ , find  $\frac{dy}{dx}$**

**Ans.**  $y = (x^2 + 1)^5 \cdot \sin 4x$   
Differentiate w.r.t.x

$$\begin{aligned}\frac{dy}{dx} &= (x^2 + 1)^5 \cdot \frac{d}{dx}(\sin 4x) + \sin 4x \cdot \frac{d}{dx}(x^2 + 1)^5 \\ &= (x^2 + 1)^5 \cdot \cos 4x \cdot 4 + \sin 4x \cdot 5(x^2 + 1)^4 \cdot 2x \\ &= 4 \cos 4x (x^2 + 1)^5 + 10x (x^2 + 1)^4 \sin 4x \\ \frac{dy}{dx} &= 2(x^2 + 1)^4 [2 \cos 4x (x^2 + 1) + 5x \cdot \sin 4x]\end{aligned}$$

**Q-2) If  $y = \sqrt{5x^2 - 3x + 1}$ , find  $\frac{dy}{dx}$**

**Ans.**  $y = \sqrt{5x^2 - 3x + 1}$   
Differentiate w.r.t.x

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx} \left[ \sqrt{5x^2 - 3x + 1} \right] \\ &= \frac{1}{2\sqrt{5x^2 - 3x + 1}} \cdot \frac{d}{dx}(5x^2 - 3x + 1) \\ &= \frac{1}{2\sqrt{5x^2 - 3x + 1}} [5(2x) - 3 + 0] \\ &= \frac{10x - 3}{2\sqrt{5x^2 - 3x + 1}}\end{aligned}$$

**Q-3) If  $y = \sin(a \cos x + b \sin x)$ , find  $\frac{dy}{dx}$**

**Ans.** Let  $y = \sin(a \cos x + b \sin x)$   
Differentiate w.r.t.x

$$\begin{aligned}\frac{dy}{dx} &= \frac{d}{dx} \left[ \sin(a \cos x + b \sin x) \right] \\ &= \cos(a \cos x + b \sin x) \cdot \frac{d}{dx}(a \cos x + b \sin x) \\ &= \cos(a \cos x + b \sin x) [a(-\sin x) + b \cos x] \\ &= (b \cos x - a \sin x) \cdot \cos(a \cos x + b \sin x)\end{aligned}$$

**Q-4) If  $y = \sqrt{\operatorname{cosec} x - \cot x}$**

**show that  $\frac{dy}{dx} = \frac{y}{2 \sin x}$**

**Ans.**  $y = \sqrt{\operatorname{cosec} x - \cot x}$   
Differentiate w.r.t.x

$$\begin{aligned}\frac{dy}{dx} &= \frac{1}{2\sqrt{\operatorname{cosec} x - \cot x}} \cdot \frac{d}{dx}(\operatorname{cosec} x - \cot x) \\ &= \frac{1}{2\sqrt{\operatorname{cosec} x - \cot x}} \cdot \left[ \frac{d}{dx}(\operatorname{cosec} x) - \frac{d}{dx}(\cot x) \right] \\ &= \frac{1}{2\sqrt{\operatorname{cosec} x - \cot x}} \cdot [(-\operatorname{cosec} x \cot x) - (-\operatorname{cosec}^2 x)] \\ &= \frac{\operatorname{cosec} x (\operatorname{cosec} x - \cot x)}{2\sqrt{\operatorname{cosec} x - \cot x}} \\ &= \frac{\sqrt{\operatorname{cosec} x - \cot x}}{2 \sin x} \\ \Rightarrow \frac{y}{2 \sin x} &\Rightarrow \frac{dy}{dx} = \frac{y}{2 \sin x}\end{aligned}$$

**Q-5) If  $y = \frac{1}{\sqrt[3]{\operatorname{cosec} x + \cot x}}$ , find  $\frac{dy}{dx}$**

**Ans.** Let  $y = \frac{1}{\sqrt[3]{\operatorname{cosec} x + \cot x}}$

$$\begin{aligned}\therefore \frac{dy}{dx} &= \frac{d}{dx} (\operatorname{cosec} x + \cot x)^{-\frac{1}{3}} \\ &= -\frac{1}{3} (\operatorname{cosec} x + \cot x)^{-\frac{4}{3}} \cdot \frac{d}{dx}(\operatorname{cosec} x + \cot x) \\ &= -\frac{1}{3} (\operatorname{cosec} x + \cot x)^{-\frac{4}{3}} [-\operatorname{cosec} x \cdot \cot x - \operatorname{cosec}^2 x] \\ &= \frac{1}{3} \operatorname{cosec} x (\operatorname{cosec} x + \cot x)^{-\frac{4}{3}} [\cot x + \operatorname{cosec} x]\end{aligned}$$

**DOWNLOAD:** <https://tinurli.com/294wrk>

**Download**

7c23cce9bc

[Salamat Sa Iyo Panginoon Mp3 Download](#)  
[Blade Runner 1982 FiNAL CUT.720p.BluRay.x264 13l](#)  
[AKVIS MakeUp 4.0.574.14313 \(x64\) Incl Patch \[SadeemPC\] full version](#)  
[cookincrankwithunclefesteravi](#)  
[Business Man full movie hd download](#)

