

# Open Mind Guruji

## Derivatives: Lecture 02

Q.3 If  $y = e^x - \frac{1}{x} + \log x$

find  $\frac{dy}{dx}$ .

→ given

$$\frac{d}{dx} e^x = e^x$$

$$\frac{d}{dx} \frac{1}{x} = \frac{-1}{x^2}$$

$$y = e^x - \frac{1}{x} + \log x \quad \text{--- (1)}$$

diff w.r.t.  $x$

$$\frac{d}{dx} \log x = \frac{1}{x}$$

$$\frac{d}{dx} y = \frac{d}{dx} \left[ e^x - \frac{1}{x} + \log x \right]$$

$$\frac{dy}{dx} = \frac{d}{dx} e^x - \frac{d}{dx} \frac{1}{x} + \frac{d}{dx} \log x$$

$$= e^x - \left[ \frac{-1}{x^2} \right] + \frac{1}{x}$$

$$\frac{dy}{dx} = e^x + \frac{1}{x^2} + \frac{1}{x}$$



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Q.5. find  $\frac{dy}{dx}$  if  $y = (x+1)(x+2)$

→ given

$$y = (x+1)(x+2) \quad \text{--- (1)}$$

diff w.r.t.  $x$

$$\frac{d}{dx} y = \frac{d}{dx} [(x+1)(x+2)]$$

$$\frac{dy}{dx} = \frac{d}{dx} [x^2 + 2x + x + 2]$$

$$= \frac{d}{dx} [x^2 + 3x + 2]$$

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

$$\frac{d}{dx} x^n = n \cdot x^{n-1}$$

$$\frac{dy}{dx} = 2 \cdot x^1 + 3 \frac{d}{dx} x + 0$$

$$= 2 \cdot x + 3 \cdot 1$$

$$\frac{dy}{dx} = 2x + 3$$

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Q.6. Find  $\frac{dy}{dx}$  if  $y = x^{10} + 10^x + e^x$

→ given

$$y = x^{10} + 10^x + e^x$$

diff w.r.t.  $x$

$$\frac{d}{dx} y = \frac{d}{dx} [x^{10} + 10^x + e^x]$$

$$\frac{dy}{dx} = \frac{d}{dx} x^{10} + \frac{d}{dx} 10^x + \frac{d}{dx} e^x$$

$$\frac{dy}{dx} = 10 \cdot x^9 + 10^x \cdot \log(10) + e^x$$

$$\frac{d}{dx} x^n = n \cdot x^{n-1}$$

$$\frac{d}{dx} a^x = a^x \cdot \log a$$

$$\frac{d}{dx} e^x = e^x$$

