

Conti. & Diff.

Standard Diff. → Derivative :-

$$\Rightarrow \text{i) } \frac{d}{dx}(x) = 1$$

$$\text{ii) } \frac{d}{dx}(c) = 0$$

$$\text{iii) } \frac{d}{dx}(x^n) = nx^{n-1}$$

$$\text{iv) } \frac{d}{dx}(cx) = c$$

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

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

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

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

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

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

$$\text{xi) } \frac{d}{dx}(\log_e x) = \frac{1}{x}$$

$$\text{xii) } \frac{d}{dx}(e^x) = e^x$$

$$\text{xiii) } \frac{d}{dx}(a^x) = a^x \cdot \log_e a$$

$$\text{xiv) } \frac{d}{dx}(\log_a x) = \frac{1}{x} \times \frac{1}{\log a}$$

$$\text{xv) } \frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

$$\text{xvi) } \frac{d}{dx}(\cos^{-1} x) = \frac{-1}{\sqrt{1-x^2}}$$

$$\text{xvii) } \frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$$

$$\text{xviii) } \frac{d}{dx}(\cot^{-1} x) = \frac{-1}{1+x^2}$$

$$\text{xix) } \frac{d}{dx}(\sec^{-1} x) = \frac{1}{x\sqrt{x^2-1}}$$

$$\text{xx) } \frac{d}{dx}(\operatorname{cosec}^{-1} x) = \frac{-1}{x\sqrt{x^2-1}}$$

Conti. & Diff.

1) $\log_e M + \log_e N = \log_e (M \cdot N)$

2) $\log_e M - \log_e N = \log_e \left(\frac{M}{N}\right)$

3) $\log_e M^N = N \cdot \log_e M$

4) $\log_b a = \frac{\log_e a}{\log_e b} = [\log_e a \times \log_b e]$

5) $\log_e e = \log_a a = \log_a a = 1$

4) $\frac{d}{dx} (\sqrt{x}) = \frac{1}{2\sqrt{x}}$

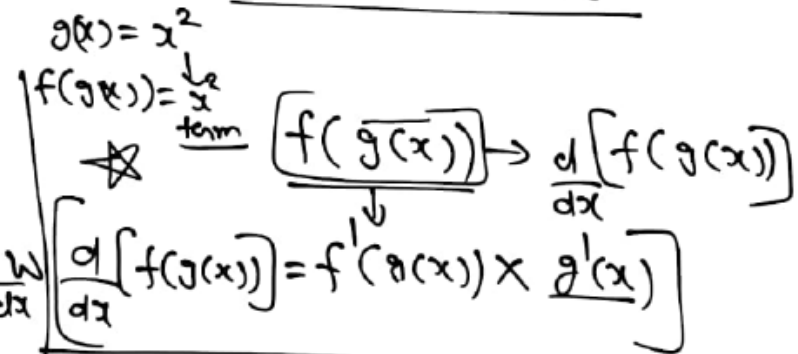
5) $\frac{d}{dx} \left(\frac{1}{x}\right) = -\frac{1}{x^2}$

Chain Rule :-

1) $\frac{d}{dx} (u \cdot v) = \frac{du}{dx} v + u \cdot \frac{dv}{dx}$

2) $\frac{d}{dx} (u \cdot v \cdot w) = \frac{du}{dx} v \cdot w + u \cdot \frac{dv}{dx} \cdot w + u \cdot v \cdot \frac{dw}{dx}$

3) $\frac{d}{dx} \left(\frac{u}{v}\right) = \frac{v \cdot \frac{du}{dx} - u \cdot \frac{dv}{dx}}{v^2} = \frac{v \cdot u' - u \cdot v'}{v^2}$



i) $\sin(2x+5)$

iii) $\cos(\sqrt{x})$

ii) $\sin(\cos(x^2))$

iv) $\frac{\sin(9x+b)}{\cos(x+a)}$