



WEDNESDAY

8th	17	18	19	20	21	22	23
9th	24	25	26	27	28	29	30

① $y = x^5 \log x$ का $\frac{dy}{dx}$ निकालें।

Solution:-

$$y = x^5 \log x$$

$$\frac{dy}{dx} = \frac{d(x^5 \log x)}{dx}$$

$$= \frac{dx^5 \cdot d \log x}{dx} + \log x \cdot \frac{dx^5}{dx}$$

$$= x^5 \cdot \frac{d \log x}{dx} + \log x \cdot \frac{dx^5}{dx}$$

$$= x^5 \cdot \frac{1}{x} + \log x \cdot 5x^4$$

$$= x^4 (1 + 5 \log x)$$

$$= x^4 + 5x^4 \log x$$

$$= x^4 (1 + 5 \log x)$$

① Find $\frac{dy}{dx}$ if $y = x^2 \log x$.

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

Notes $= x^2 \cdot \frac{1}{x} + \log x \cdot 2x$

$$= x + 2x \log x$$

$$= x(1 + 2 \log x)$$

Quotient Rule (भागफल के नियम)

5th	03	04	05	06	07	08	09
6th	10	11	12	13	14	15	16
7th	17	18	19	20	21	22	23
8th	24	25	26	27	28	29	30

$$\frac{d \text{ अंश}}{dx (\text{हर})} = \frac{\text{हर } (d \text{ अंश}) - \text{अंश } (d \text{ हर})}{(\text{हर})^2}$$

Case-1

Q:-

$$y = \frac{x^2 + 2}{x^2}$$

$$= \frac{x^2 + 2}{x^2} \times \frac{x^2}{x^2}$$

$$= \frac{x^2 (d x^2 + 2) - (x^2 + 2) d x^2}{x^4}$$

$$= \frac{x^2 (2x) - (x^2 + 2) 2x}{x^4}$$

$$= \frac{2x^3 - (2x^3 + 4x)}{x^4}$$

$$= \frac{\cancel{2x^3} - \cancel{2x^3} - 4x}{x^4} = \frac{-4x}{x^4}$$

$$= \frac{-4}{x^3}$$

Case-II यदि $y = (x-a)(x-b)$ तो x का मान निकालिए जिसके लिए $\frac{dy}{dx} = 0$

Solution :-

$$y = (x-a)(x-b)$$

$$\frac{dy}{dx} = (x-a) \frac{d}{dx}(x-b) + (x-b) \frac{d}{dx}(x-a)$$

$$= (x-a) \cdot 1 + (x-b) \cdot 1$$

unday 23

$$= x-a+x-b$$

$$= 2x-a-b$$

tes

$$2x = a+b$$

$$\therefore 2x = a+b$$

$$x = \frac{a+b}{2}$$

$$1) \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2$$

$$= (\sqrt{x})^2 + 2 \cdot \cancel{\sqrt{x}} \cdot \frac{1}{\cancel{\sqrt{x}}} + (\frac{1}{\sqrt{x}})^2$$

$$= x + 2 + \frac{1}{x}$$

$$= \frac{dx}{dx} + 0 + x^{-1}$$

$$= 1 - 1 \left(\frac{dx^{-1-1}}{dx} \right)$$

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

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

Ans:

Case-IV

If $f(x) = \frac{x-4}{2\sqrt{x}}$ then find $f'(4)$.

$$f(x) = \frac{x-4}{2\sqrt{x}}$$

$$= \frac{1}{2} \left[\sqrt{x} \frac{d(x-4)}{dx} - (x-4) \frac{d\sqrt{x}}{dx} \right]$$

$$\text{DAY} = \frac{1}{21} \left[\frac{\sqrt{x} d(x-4)}{dx} \right]$$

$$= \frac{1}{21} \left[\sqrt{x} \cdot 1 \cdot (-x+4) \frac{d\sqrt{x}}{dx} \right]$$

$$= \frac{1}{21} \left[\sqrt{4} (-4+4) \cdot \frac{1}{2\sqrt{x}} \right]$$

$$= \frac{1}{21} \left[\frac{2 - 0}{2\sqrt{4}} \right]$$

$$= \frac{1}{21} \left[\frac{2}{2 \times 2} \right]$$

$$= \frac{1}{21} \times \frac{1}{2} = \frac{1}{42}$$

01	02	03	04	05	06	07	08
09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32

Q:-

$$\frac{x-1}{\sqrt{x+1}}$$

Solution:-

$$\frac{x-1}{\sqrt{x+1}} \times \frac{\sqrt{x+1}}{\sqrt{x+1}}$$

$$= \frac{\sqrt{x+1} \cdot (x-1)}{(\sqrt{x+1})^2} = \frac{\sqrt{x+1} \cdot (x-1)}{x+1}$$

$$= \frac{\sqrt{x+1} \cdot x - \sqrt{x+1}}{x+1} = \frac{x\sqrt{x+1} - \sqrt{x+1}}{x+1}$$

$$= \frac{x\sqrt{x+1} - \sqrt{x+1}}{x+1} = \frac{\sqrt{x+1}(x-1)}{x+1}$$

$$= \frac{x\sqrt{x+1} - \sqrt{x+1}}{x+1}$$

$$= \frac{x\sqrt{x+1} - \sqrt{x+1}}{x+1}$$

$$= \frac{x+3}{2(x+1)^{\frac{3}{2}}}$$

$$= \frac{x+3}{2(x+1)^{\frac{3}{2}}}$$

Notes