

Worksheet on Differentiation

Evaluate:

1. If $y = \log \left[e^x \left(\frac{x-1}{x+2} \right)^{\frac{1}{2}} \right]$, find $\frac{dy}{dx}$. [Ans. = $1 + \frac{3}{2(x-1)(x+2)}$]

2. If $xy = e^{x-y}$, find $\frac{dy}{dx}$. [Ans. = $\frac{(x-1)y}{x(1+y)}$]

3. $y = \frac{e^x \log x}{x^2}$, find $\frac{dy}{dx}$.

4. $y = e^{(1+\log x)}$, find $\frac{dy}{dx}$. [Ans. = e]

5. $f(x) = \log_x(\log_e x)$, find $f'(x)$ at $x = e$. [Ans. = 1]

6. $y = e^{\frac{1}{2} \log(1 + \tan^2 x)}$, find $\frac{dy}{dx}$. [Ans. = $(\sec x + \tan x)$]

7. $y = a^x b^{2x-1}$, find $\frac{d^2 y}{dx^2}$. [Ans. = $y(\log a b^2)^2$]

8. $y = x^x$, find $\frac{dy}{dx}$. [Ans. = $y(1 + \log_e x)$]