Differentiability - Class XII

Past Year JEE Questions

Questions

Quetion: 01

If $x^m . y^n = (x + y)^{m+n}$, then $\frac{dy}{dx}$ is

A. $\frac{y}{x}$

B. $\frac{x+y}{xy}$

C. xy

D. $\frac{x}{y}$

Solutions

Solution: 01

Explanation

$x^m . y^n = (x + y)^{m+n}$

$\Rightarrow m \ln x + n \ln y = (m + n) \ln(x + y)$

Differentiating both sides.

$\therefore \frac{m}{x} + \frac{n}{y}\frac{dy}{dx} = \frac{m+n}{x+y}\left(1 + \frac{dy}{dx}\right)$

$\Rightarrow \left(\frac{m}{x} - \frac{m+n}{x+y}\right) = \left(\frac{m+n}{x+y} - \frac{n}{y}\right)\frac{dy}{dx}$

$\Rightarrow \frac{my-nx}{x(x+y)} = \left(\frac{my-nx}{y(x+y)}\right)\frac{dy}{dx}$

$\Rightarrow \frac{dy}{dx} = \frac{y}{x}$