Derivative - Class XII

Past Year JEE Questions

Questions

Quetion: 01

If $f(1) = 1$, $f'(1) = 3$, then the derivative of $f(f(f(x))) + (f(x))^2$ at $x = 1$ is :

A. 33

B. 12

C. 9

D. 15

Solutions

Solution: 01

Explanation

Given $f(1) = 1$, $f'(1) = 3$

Let $y = f(f(f(x))) + (f(x))^2$

On differentiating both sides with respect to x we get,

$\frac{dy}{dx} = f'(f(f(x))).f'(f(x)).f'(x) + 2f(x).f'(x)$

Now at $x = 1$,

$\frac{dy}{dx} = f'(f(f(1))).f'(f(1)).f'(1) + 2f(1).f'(1)$

$= f'(f(1)).f'(1).f'(1) + 2.1.f'(1)$

$= f'(1).f'(1).f'(1) + 2.1.f'(1)$

$= 3 \times 3 \times 3 + 2 \times 3$

$= 33$