30|08|xx Class- XII^{sc} (MATHS) K·Kanhaiya

Integrate :-

(1) $\int \sec x(\sec x + \tan x)\,dx$

$= \int \sec^2 x\,dx + \int \sec x \tan x\,dx$

$= \tan x + \sec x + C$

(2) $\int \frac{\sec^2 x}{\operatorname{cosec}^2 x}\,dx$

$\int \frac{\sin^2 x}{\cos^2 x}\,dx$

$\int \tan^2 x\,dx$

$\int (\sec^2 x - 1)\,dx$

$\tan x - x + C$

(3) If $f(x) = 4x^3 - \frac{3}{x^4}$, such that $f(2) = 0$, then $f(x)$ is

Ans $\because f'(x) = \frac{d[f(x)]}{dx}$

So $\int f'(x)\,dx =$

$$f(x) = \int \left(4x^3 - \frac{3}{x^4}\right) dx$$

$$f(x) = \frac{\cancel{4}x^4}{\cancel{4}} - \int 3x^{-4}\,dx$$

$$f(x) = x^4 - \cancel{3}\cdot\frac{x^{-3}}{-\cancel{3}} + c$$

$$\cancel{f(x) = 1\, x^4 + \frac{3}{5x^5} + c}$$

$$f(x) = x^4 + \frac{1}{x^3} + c$$

$\because f(2) = 0$

$$0 = 2^4 + \frac{1}{2^3} + c$$

$$0 = 16 + \frac{1}{8} + c$$

$$-\frac{16}{1} - \frac{1}{8} = c$$

$$\frac{-128 - 1}{8} = c$$

$$-\frac{129}{8} = c$$

$\therefore$

$$f(x) = x^4 + \frac{1}{x^3} - \frac{129}{8}.$$

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