Date
15 Oct 2025

SEM-1 (B.Sc)

Unit-1

* Concept of Differentiation :-
Differentiation is an aspect of calculus that enables us to determine how one quantity changes with regard to another.

1. Differentiation of a simple power.

* To differentiate $s = t^n$.

$$\frac{ds}{dt} = \frac{d(t^n)}{d(t)}$$

$$= n \cdot t^{n-1}$$

For Example:- ① If we need to find the differentiation of x^5.

Sol:- Let $y = x^5$.

Differentiate with respect to x. on both sides then

$$\frac{dy}{dx} = \frac{d\,x^5}{dx}$$

$$= 5 \cdot x^{5-1}$$

$$= 5 \cdot x^4 = 5x^4$$ Ans.

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SEM 1

Example (ii) :- Differentiate the following

(a) $x^5 + 2$ (b) $x^3 + 5x$.

Sol :- (a) Let $y = x^5 + 2$

D. w. r. to x.

$$\frac{dy}{dx} = \frac{d(x^5+2)}{dx}$$

$$\frac{dy}{dx} = \frac{dx^5}{dx} + \frac{2 \cdot d(0)}{dx}$$

$$= 5 \cdot x^{5-1} + 0$$

$$= 5 \cdot x^4.$$

$$\frac{dy}{dx} = 5x^4 \quad \text{Ans.}$$

(b) Let $y = x^3 + 5x$.

d. w. r. to x.

$$\frac{dy}{dx} = \frac{d(x^3+5x)}{dx}$$

$$\frac{dy}{dx} = \frac{dx^3}{dx} + \frac{5d \cdot x}{dx}$$

$$= 3 \cdot x^{3-1} + 5$$

$$= 3x^2 + 5 \quad \text{Ans}$$

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H.W

Solve the following for $\frac{dy}{dx}$ of

(i) $y = x^7 + x^5 + 2x$ (ii) $y = x^3 + 2x^2 + 5x$

(iii) $y = 3x^2 + 5x + 2$ (iv) $y = 2x^2 + 3x + 5$.

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