

Question No 3:

Find the derivatives of the following.

(a) $S = -4t^{-5} + 4/t + 5t + 1/4$

Sol: $S = -4t^{-5} + 4t^{-1} + 5t + 1/4$

Differentiate w-r-to t.

$$\frac{ds}{dt} = \frac{d}{dt} (-4t^{-5} + 4t^{-1} + 5t + \frac{1}{4})$$

$$\frac{ds}{dt} = \frac{d}{dt} (-4t^{-5}) + \frac{d}{dt} (4t^{-1}) + \frac{d}{dt} (5t) + \frac{d}{dt} (\frac{1}{4})$$

$$= 20t^{-6} - 4t^{-2} + 5 = 0$$

$$S' = 20t^{-6} - 4t^{-2} + 5 = 0 \quad \underline{\underline{Ans}}$$

(b)

$$y = x^5 + 3x^3 - x^2 + 4$$

Sol: Differentiate w-r-to x

$$\frac{dy}{dx} = \frac{d}{dx} (x^5 + 3x^3 - x^2 + 4)$$

$$\frac{dy}{dx} = \frac{d}{dx} (x^5) + 3 \frac{d}{dx} (x^3) - \frac{d}{dx} (x^2) + \frac{d}{dx} (4)$$

$$\frac{dy}{dx} = 5x^4 + 9x^2 - 2x + 0$$

$$y' = 5x^4 + 9x^2 - 2x. \quad \underline{\underline{\text{Ans}}}$$

$$(c) T = 6x^{-3} + x^3 + 5x - 2$$

Sol: Differentiate w-r-to x .

$$\frac{dT}{dx} = \frac{d}{dx} (6x^{-3} + x^3 + 5x - 2)$$

$$= 6 \frac{d}{dx} x^{-3} + \frac{d}{dx} x^3 + 5 \frac{d}{dx} x - \frac{d}{dx} 2$$

$$= -18x^{-2} + 3x^2 + 5 - 0$$

$$T' = -18x^{-2} + 3x^2 + 5 = \underline{\underline{\text{Ans}}}$$

Question No 1.

Find the Integration of the Following.

(a) $\int (x^2 e^x) dx$

Sol: $P(x) \quad x^2 = \text{First function}$

$e^x = \text{Second function}$

$$\int x^2 e^x dx = x^2 e^x - \int 2x e^x dx \quad \text{--- (1)}$$

Now,

$$\int x e^x dx = x e^x - \int 1 \cdot e^x dx \quad \text{--- (2)}$$

Substitute eq (2) in eq (1) to get

$$\begin{aligned} \int x^2 e^x dx &= x^2 e^x - 2 \int x e^x dx \\ &= x^2 e^x - 2(x e^x - e^x) \end{aligned}$$

$$= x^2 e^x - 2x e^x + 2e^x + C \quad \underline{\underline{\text{Ans}}}$$

(4)

$$(b) \int (5x^2 + x^{-2} + 15) dx$$

$$\underline{\text{sol:}} \cdot 5 \int x^2 dx + \int x^{-2} dx + \int 15 dx$$

$$5 \frac{x^3}{3} + \frac{x^{-2+1}}{-2+1} + 15x$$

$$\int (5x^2 + x^{-2} + 15) dx = \frac{5x^3}{3} - \frac{1}{x} + 15x \quad \underline{\underline{\text{Ans}}}$$

$$(c) \int (x^3 + x^{-2} + 5) dx$$

$$\underline{\text{sol:}} \cdot \int (x^3 + x^{-2} + 5) dx$$

$$= \int x^3 dx + \int x^{-2} dx + 5 \int dx$$

$$= \frac{x^4}{4} + \frac{x^{-1}}{-1} + 5x$$

$$= \frac{x^4}{4} - \frac{1}{x} + 5x \quad \underline{\underline{\text{Ans}}}$$

Question No 2:

Find solution of the following.

a) If 56% of the homes in a colony have a car. What percentage of homes does not have a car?

Sol: Number of homes have a car = 56%

Number of homes have not a car = $(100 - 56)\%$

= 44% Ans

b) There are 1029 students in a school. 504 of them are girls. Find the ratio of the boys to girls.

Sol: Total number of students = 1029

Number of Girls = 504

Then,

Number of boys will be = $1029 - 504$
= 525

Ratio of boys to girls = $\frac{\text{boys}}{\text{girls}} = \frac{525}{504} = \frac{1042}{1}$

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© Amina scored 46 out of 50 in a Math test, 64 out of 75 in a chemistry test, 72 out of 80 in a physics test - In which subject did she perform best?

Sol: In Math test = $\frac{46}{50} \times 100 = 92\%$

In chemistry test = $\frac{64}{75} \times 100 = 85\%$

In physics test = $\frac{72}{80} \times 100 = 90\%$

She performed best in Maths test.