

Name

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Subject

= Mathematics I

Q No 01 Find the integration of the following.

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

Ans Sol:

$$\int x^2 e^x dx$$

Applying integration by parts

$$\int x^2 e^x dx = x^2 \int e^x dx - \int \left(\frac{d}{dx} x \int e^x dx \right)$$

$$= x^2 e^x - \int 1 e^x dx$$

$$= x^2 e^x - \int e^x dx \Rightarrow x^2 e^x - e^x + c$$

$$= e^x (x^2 - 1) + c \quad \text{Ans.}$$

QNo 01 Part (b):-

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

Ans Sol:-

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

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

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

$$= \frac{5}{3}x^3 - \frac{1}{x} + 15x + C \quad \text{Ans}$$

QNo 02 Part (c):-

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

Ans Sol:-

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

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

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

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

Q No 02 Find the solution of the following.

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

Ans Sol:

Total number of homes in the colony = 100%

number of homes having a cars = 56%

number of homes having no cars = $100 - 56$

= 44% Ans.

Q No 02 Part (b) :-

Ans

Solr

Total number of students
= 1029

number of girls = 504

number of boys = $1029 - 504$
= 525

Required Ratio

= number of boys : number of girls

= 525 : 504

= 175 : 168

= 25 : 24 Ans.

Q No of Part (C):

Ans Sol:

$$\% \text{ age of Scored in math} = \frac{46}{50} \times 100$$

$$= 92\%$$

$$\% \text{ age of Scored in chemistry} = \frac{64}{75} \times 100$$

$$= 85.3\%$$

$$\% \text{ age of Scored in physics} = \frac{72}{80} \times 100$$

$$= 90\%$$

Thus the greatest percentage is 92% in math. So Anna performed the best in math.

Q No 03 Part (b) :-

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

Ans Sol:-

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

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

$$\frac{dy}{dx} = 5x^4 + 3(3)x^2 - 2x + 0$$

$$\frac{d^2 y}{dx^2} = 5x^4 + 9x^2 - 2x \quad \text{Ans.}$$

Q No 03 Part (c) :-

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

Ans Sol:-

$$6x^{-3} + x^3 + 5x - 2$$

Take derivative

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

$$= -18x^{-4} + 3x^2 + 5(1) = 0$$

$$= \frac{-18}{x^4} + 3x^2 + 5 \quad \text{Ans.}$$

Q No 03 Find the derivatives of the following.

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

Ans Sol:-

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

$$= -20t^{-6} - 4t^{-2} + 5(1) + 0$$

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

$$= 5 - \frac{20}{t^6} - \frac{4}{t^2} \quad \text{Ans}$$