

Mam Shama

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QUIZ :- 1

Summer exam

Find $\int_0^1 \frac{4t^3 - 2t^2 + 3t - 1}{2t^2 + 1} dt$

Solution:

$$\int_0^1 \frac{4t^3 - 2t^2 + 3t - 1}{2t^2 + 1} dt$$

$$= \int_0^1 \left((2t-1) + \frac{t}{2t^2+1} \right) dt$$

$$= \int_0^1 (2t-1) dt + \int_0^1 \frac{t}{2t^2+1} dt$$

$$= \left(\frac{2t^2}{2} - t \right) \Big|_0^1 + \frac{1}{4} \int_0^1 \frac{4t}{2t^2+1} dt$$

$$= (t^2 - t) \Big|_0^1 + \frac{1}{4} \ln(2t^2+1) \Big|_0^1$$

$$= (1-1) - 0 + \frac{1}{4} \{ \ln(3) - \ln(1) \}$$

$$= 0 + \frac{1}{4} \{ \ln 3 - 0 \}$$

$$= \frac{1}{4} \ln 3$$

$$= \boxed{0.44}$$

$$\frac{2t-1}{2t^2+1} \int \frac{4t^3 - 2t^2 + 3t - 1}{2t^2+1} dt$$

$$= 2t^2 + 1$$

$$- 2t^2 + 1$$

$$\in 2t^2 \in 1$$

$$t$$

Find $\int_2^3 t \sin t^2 dt$ (2)

Solution:

$$\begin{aligned} & \int_2^3 t \sin t^2 dt \\ &= \int_4^9 \frac{\sin x dx}{2} \\ &= \frac{1}{2} \int_4^9 \sin x dx \\ &= \frac{1}{2} (-\cos x) \Big|_4^9 \\ &= \frac{1}{2} \cos x \Big|_4^9 \\ &= -\frac{1}{2} (\cos 9 - \cos 4) \\ &= -\frac{1}{2} (0.98 - 0.99) \\ &= -\frac{1}{2} (-0.01) \end{aligned}$$

$$= 0.002$$

$$\text{let } t^2 = x$$

diff. wrt t

$$2t = \frac{dx}{dt}$$

$$2t dt = dx$$

$$t dt = \frac{dx}{2}$$

$$t^2 = x$$

$$\text{at } t = 2$$

$$x = 4$$

$$\text{at } t = 3$$

$$x = 9$$