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Subject Calculas

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Quiz of Calculas

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Question # 01 :-

FIND =

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

Solution :-

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

Now: By partial fraction method.

=> Divide $4t^3 - 2t^2 + 3t - 1$ by $2t^2+1$

$$\Rightarrow \int_0^1 2t - 1 + \frac{t}{2t^2+1}\, dt$$

$$\Rightarrow \int_0^1 2t\, dt + \int_0^1 -1\, dt + \int_0^1 \frac{t}{2t^2+1}\, dt$$

$$\Rightarrow 2\int_0^1 t\, dt + \int_0^1 -1\, dt + \int_0^1 \frac{t}{2t^2+1}\, dt$$

Using power rule :

Now :

$\Rightarrow 2\left(\frac{1}{2}t^2\right)_0^1 \Big] + \int^1 -1\, dt + \int_0^1 \frac{t}{2t^2+1}\, dt$

$\Rightarrow$ Combine $\frac{1}{2}\ t^2$

$\Rightarrow 2\left[\left(\frac{t^2}{2}\right)_0^1\right] + \int_0^1 -1\, dt + \int_0^1 \frac{t}{2t^2+1}\, dt$

$\Rightarrow 2\left(\left(t^2/2\right)_0^1\right) + \left(-t\right)\Big]_0^1 + \int_0^1 \frac{t}{2t^2+1}\, dt$

Now :-

Using Substitution

Let $u = 2t^3 + 1$ Then $du = 4t\ dt$ so

$1/4\ du = t\, dt$

$= 2\left[\left[t^2/2\right]_0^1\right] + \left(-t\right)\Big]_0^1 + \int_1^3 \frac{1}{u} \cdot \frac{1}{4}\, du$

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$$\Rightarrow 2\left(\frac{t}{2}\right)_0^1\Big] + (-t)\Big]_0^1 + \int_1^3 \frac{1}{4u}\,du$$

$\Rightarrow$ Now by applying limit rule

Get:-

$$f(x) = 0.2746.$$

QUESTION :- 02

$$\int_2^3 t \sin^2 d\tau$$

Solution:-

$$\int_2^3 t \sin^2 d\tau$$

let us $u = t^2$

$du = 2t \, dt$

$\Rightarrow$ Then $dt = du / 2t$

Now Replace Value of t & dt

$\Rightarrow \int_2^3 \cancel{t} \sin u \; du / 2\cancel{t}$

$\Rightarrow \int_2^3 \frac{1}{2} \sin u \, du$

$\Rightarrow -\frac{1}{2} \cos u \Big|_2^3$

Now Replace u with t^2
Then We Get...

$= -\frac{1}{2} \cos t^2 \Big|_2^3$ By Applying limits

$= -\frac{1}{2} \left(\cos(3)^2 - \cos(2)^2 \right)$

$= -\frac{1}{2} (\cos 9 - \cos 4)$

$= \boxed{0.0049}$ Ans.