Day: M T W T F S

Date: __/__/__

Name : M. Daud

ID : 7769

Subject : Calculas

Submitted to : Engr shomaila mazhar

Quiz No 1 :

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

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

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

$= \int_0^1 \frac{t(4t^2 + 3) - (2t^2 + 1)}{2t^2 + 1}$

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

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

$= \int_0^1 t\,\frac{(4t^2 + 3)}{2t^2 + 1}\, dt - [1 - 0]$

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$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1} \quad -1 \longrightarrow (1)$$

=> Now ..

= let $2t^2+1 = y$ => $2t^2+1=y$

As

$t \to$ i.e $y=3$ $\quad 2t^2 = y-1$

$t \to 0$ i.e $y=1$ $\quad 4t^2 = 2y-2$

$4t^2+3 = 2y-2+3$

Now differentiate.

= $4t = dy/dt$ $\quad 4t^2+3 = 2y+1$

= $dt = dy/dt$

$$= \int_1^3 \frac{t(2y+1)}{4} \, dy - 1$$

$$= \frac{1}{4}\left[\int_1^3 \frac{2y\,dy}{y} + \int_1^3 1/y \, dy\right] - 1$$

$$= 1/4 \left[\int_1^3 2\,dy + \int_1^3 \frac{1}{y}\,dy\right] - 1$$

$$= 1/4 \left[2y\int_1^3 + \ln y \int_1^3\right] - 1$$

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$= 1/4 \left[2(3) - 2(1) + \ln(3) - \ln(1) \right] - 1$

$= 1/4 \left[6 - 2 + 1.0986 \right) - 1$

$1/4 \left[5.0986 \right] - 1$

$\Rightarrow 1.27465 - 1$

$\boxed{0.2746}$ Ans

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Q No 2.:

$$\int_2^3 t \sin t^2 \, dt$$

Sol:

Let $t^2 = y$

diff w.r.t t^2

$2t = dy/dt$

$dt = dy/2t$

$t^2 = y$

$(3)^2 = y$

$9 = y$

Now

As $t \to 3$ then $y = 9$

As $t \to 2$ then $y = 4$

So

$$= \int_2^3 t \sin t^2 \, dt = \int_4^9 t \sin y \, dy/t$$

$$= \int_4^9 \sin y \, dy$$

$$= -\cos y \int_4^9$$

$$= -[\cos(9) - \cos(4)]$$

$$= -[0.9876 - 0.9775]$$

$$= -(-0.00987)$$

$$+0.00987$$ Ans

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