Name Imad Ahmad

ID 16082

Section A.

~~Semes~~

Subject Calculus.

Quiz No 01.

Submitted to Mam Shumail mazhar.

Q.2 $\int_2^3 t \cdot \sin t^2 \, dt.$

let $u = t^2$ then $du = 2t\,dt$.

$\Rightarrow \frac{1}{2} du = t\,dt$

So $\int_4^9 \sin(u) \cdot \frac{1}{2} du$

$= \int_4^9 \frac{\sin(u)}{2} du.$

Since $\frac{1}{2}$ is constant with respt to u.

$\Rightarrow \frac{1}{2} \int_4^9 \sin(u) du$ $\quad \Big| \int \sin u = -\cos u$

$\Rightarrow \frac{1}{2} - \cos(u). \Big|_4^9$

$\Rightarrow \frac{1}{2} \left(-\cos(9) + \cos(4)\right)$

$\Rightarrow \boxed{0.12874332}$ answer.

Q.(1)

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

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

Splite integrals.

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

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

By power rule.

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

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

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

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let $u = 2t^2+1$ then $du = 4t\,dt$.

So $\frac{1}{2}du = t\,dt$

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

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

$\Rightarrow \frac{1}{4}$ is constant

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

$\Rightarrow 2\left(\frac{t^2}{2}\Big|_0^1 + -t\Big|_0^1 + \frac{1}{4}\ln(|u|)\Big|_1^3\right.$

$\Rightarrow \frac{1}{4}(\ln(|3|) - \ln(|1|)$.

$\Rightarrow \ln(3^{1/4})$

$\boxed{0.27465307}$ Answer