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SECTION A

SUBJECT A - CALCULUS

QUIZ

SUBMITTED TO MADAM SHOMAILA MAZHAR.

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ANSWER TO QUESTION NO 1

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

SOLUTION:

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

Now Expand the term

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

APPLY SUM RULE ...

$$= \int f(x) \pm g(x) = \int f(x)dx \pm \int g(x)dx$$

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

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

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

$$\Rightarrow \int_0^1 \frac{3t}{2t^2+1}dt = \frac{3}{4}\ln(3) \longrightarrow ③$$

$$\Rightarrow \int_0^1 \frac{1}{2t^2+1}dt = \frac{1}{\sqrt{2}}\tan^{-1}(\sqrt{2}) \longrightarrow ④$$

Comparing ①, ②, ③ ④

$$1-\frac{1}{2}\ln(3)-\left(-\frac{1}{\sqrt{2}}\tan^{-1}(\sqrt{2})+1\right)+\frac{3}{4}\ln(3)-\frac{1}{\sqrt{2}}\tan^{-1}(\sqrt{2})$$

By Simplifying, we get

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

$$\boxed{=0.27465}$$ ANSWER

ANSWER TO QUESTION NO 2:

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

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

we Suppose that

$$= t^2 = u$$

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

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

$$= \int_2^3 \cancel{t}\,\sin u\,\frac{du}{2\cancel{t}}$$

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

$$= \frac{1}{2}\left[-\cos(3) + \cos(2)\right]$$

$$= \frac{1}{2}\left[-99863 + 0.9994\right]$$

So

$$\boxed{\int_2^3 t\sin t^2 \, dt = 0.000385}$$

ANSWER

.Y ——— X ——— X.