DATE: 08/06/2023

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PROG: BS (CS)

CALCULUS ASSIGNMENT #04

Evaluate:-

1) $\int_{-1}^{1} (2 - |x|)\, dx$

Sol:-

$$\Rightarrow \int_{-1}^{1} (2 - (+x))\, dx + \int_{-1}^{1} ((2 - (-x))\, dx$$

$$\Rightarrow \left[2x - x^2\right]_{-1}^{+1} + \left[2x + x^2\right]_{-1}^{1}$$

$$\Rightarrow \left[2(1) - \frac{1}{2} - (2(-1) - \frac{1}{2})\right] + \left[2(1) + \frac{1}{2} - (2(-1) + \frac{1}{2})\right]$$

$$\Rightarrow 2 - \frac{1}{2} + 2 + \frac{1}{2} + 2 + \frac{1}{2} + 2 - \frac{1}{2}$$

$$\Rightarrow 2 + 2 + 2 + 2$$

$$\Rightarrow 8 \text{ Ans}$$

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2) $\int_{-1}^{1} \left(1+\sqrt{1-x^2}\right) dx$

Sol:-

$\Rightarrow \left[x + \frac{(1-x^2)^{1/2+1}}{1/2+1}\right]_{-1}^{1}$

$\Rightarrow \left[x + 2\frac{(1-x^2)^{3/2}}{3}\right]_{-1}^{1}$

$\Rightarrow 1 + 2\frac{(1-(1)^2)^{3/2}}{3} - \left((-1) + 2\frac{(1-(-1)^2)^{3/2}}{3}\right)$

$\Rightarrow 1 + \frac{2(0)}{3} + 1 - \frac{2(1-1)^{3/2}}{3}$

$\Rightarrow 1+0+1-0 \Rightarrow 2+C$ //.

3) $\int_{1}^{\sqrt{2}} \left(\frac{s^2+\sqrt{3}}{s^2}\right) ds$

Sol.

$\Rightarrow \int_{1}^{\sqrt{2}} \frac{s^2}{s^2} + \frac{s^{1/2}}{s^2}\, ds$

$\Rightarrow \int_{1}^{\sqrt{2}} 1 + s^{1/2-2}\, ds$

$\Rightarrow \left[s + \frac{s^{-3/2+1}}{-3/2+1}\right]_{1}^{\sqrt{2}}$

$\Rightarrow \left[s - \frac{2}{\sqrt{s}}\right]_{1}^{\sqrt{2}}$

$\Rightarrow \sqrt{2} - \frac{2}{\sqrt{2}^{1/2}} - \left(0 - \frac{2}{0}\right)$

$\Rightarrow \sqrt{2} - 2^{3/4} + C$ //