NAME: Zohaib Ahmad

ID = 7797

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Submitted to Madam Shomaila

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Quiz #01

Q① Estimate $\int_{0.5}^{1.3} e^{x^2}$

- Use trapezoidal rule a strip with of 0.2.

= $a = 0.5$, $b = 1.3$, $\Delta x = 0.2$.

= Now divide the interval into 0.2 subintervals with the following end points.

$a = 0.5$, 0.7 , 0.9 , 1.1 , 1.3 $= b$

- $f(x_0) = f(0.5) = 1.28$

= $2f(x_1) = 2f(0.7) = 3.265$

= $2f(x_2) = 2f(0.9) = 4.496$.

- $2f(x_3) = 2f(1.1) = 6.707$

= $f(x_4) = f(1.3) = 5.419$

$$\int_{0.5}^{1.3} e^{x^2} = \frac{\Delta x}{2}\left[f(x_0) + 2f(x_1) + 2f(x_2) + 2f(x_3) + 2f(x_4)\right]$$

$$= \frac{0.2}{2}\left[1.28 + 3.265 + 4.496 + 6.707 + 5.419\right]$$

$$\int_{0.5}^{1.3} e^{x^2} = 2.117 \quad \text{Ans.}$$

* Use Simpson's rule a strip width of 0.1.

→ $\int_{0.5}^{1.3} ex^2$.

Sol.

$a = 0.5$, $b = 1.3$, $\Delta x = 0.1$

$a = 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3 = b$.

$= f(x_0) = f(0.5) = 1.28$

$= f(x_1) = F(0.6) = 1.433$

$= F(x_2) = F(0.7) = 1.633$

$= f(x_3) = f(0.8) = 1.896$

$= F(x_4) = F(0.9) = 2.248$

$= f(x_5) = F(1.0) = 2.718$

$= F(x_6) = F(1.1) = 3.353$

$= F(x_7) = f(1.2) = 4.221$

$= f(x_8) = F(1.3) = 5.419$

$$\int_{05}^{1.3} ex^2 = \frac{\Delta x}{3}\left[f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + 2f(x_4) + 4f(x_5) + 2f(x_6) + 4f(x_7) + f(x_8)\right].$$

$$= \frac{0.1}{3}\left[1.28 + 4(1.433) + 2(1.633) + 4(1.896) + 2(2.248) + 4(2.718) + 2(3.353 + 4(4.221) + 5.419\right]$$

$$= \int_{05}^{1.3} ex^2 = 2.075. \text{ Ans}$$