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QUIZ :- 1

Subject :- Numerical analysis.

Summer exam.

Estimate

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

use trapezoidal rule a
strip with of 0.2.

SOLUTION:-

As we know that

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

Now divide the interval into
0.2 subinterval with the following
endpoints.

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

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

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

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

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

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

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

Putting the values.

$$= \frac{0.2}{2} [1.28 + 3 \cdot 2.65 + 4 \cdot 4.96 + 6 \cdot 7.07 + 5.419]$$

$$\int_{0.5}^{1.3} e^{x^2} = 2.117$$

Answer.

Estimate

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

Use Simpsons Rule a strip width of 0.1.

SOLUTION:-

By using Simpsons Rule.

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

Now divide the interval into 0.1 subintervals with the following ends points.

$$2n = \frac{b-a}{\Delta x}$$

$$2n = \frac{1.3 - 0.5}{0.1}$$

$$n = 4$$

0.1	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3
$f(x)$	1.28	1.43	1.63	1.89	2.24	2.71	3.35	4.22	5.41

$$A = \frac{\Delta x}{3} \left[f(x_0) - 4f(x_2) + f(x_3) + f(x_5) + f(x_8) \right. \\ \left. + 2f(x_3) + f(x_4) + f(x_6) + f(x_8) \right].$$

Putting the values.

$$A = \frac{0.1}{3} \left[1.28 + 4(1.43 + 1.39 + 2.71 + 4.22) \right. \\ \left. + 2(1.63 + 2.24 + 3.35 + 5.41) \right].$$

$$A = \frac{0.1}{3} [1.28 + 41 + 14.44 + 5.41].$$

$$A = 2.071$$