

M. Remaz

Quiz

7541

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

i) Evaluate through trapezoidal rule with strip width 0.2

Sol:

Given integral

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

Here $a = 0.5$, $b = 1.3$, $f(x) = e^{x^2}$, $h = 0.2$

Then

$$h = \frac{b-a}{n} \Rightarrow 0.2 = \frac{1.3-0.5}{n} \Rightarrow n = \frac{0.8}{0.2}$$

$$n = 4$$

x	0.5	0.7	0.9	1.1	1.3
$f(x)$	1.284	1.632	2.247	3.353	5.419

Using trapezoidal rule for 5 points

$$\int_a^b f(x) dx = \frac{h}{2} [f_0 + 2(f_1 + f_2 + f_3) + f_4]$$

$$\int_{0.5}^{1.3} e^{x^2} dx = \frac{0.2}{2} [1.284 + 2(1.632 + 2.247 + 3.353) + 5.419]$$

$$= 2.1167 \text{ ANSWER}$$

M. Remaz

Quiz

7541

Q No # 2

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

Evaluate through Simpson rule with strip width of 0.2

Sol:

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

Here: $a = 0.5$, $b = 1.3$, $f(x) = e^{x^2}$, $h = 0.1$

$$h = \frac{b-a}{n} \Rightarrow 0.1 = \frac{1.3-0.5}{n} = \frac{0.8}{n}$$

$$n = 8$$

x	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
$f(x)$	1.284	1.433	1.632	1.896	2.247	2.71	3.353	4.220	5.419

Using Simpson rule of 9 points

$$\int_a^b f(x) dx = \frac{h}{3} \left[f_0 + 4(f_1 + f_3 + f_5 + f_7) + 2(f_2 + f_4 + f_6) + f_8 \right]$$

$$\int_{0.5}^{1.3} e^{x^2} dx = \frac{0.1}{3} \left[1.284 + 4(1.433 + 1.896 + 2.71 + 4.220) + 2(1.632 + 2.247 + 3.353) + 5.419 \right]$$

$$= 0.03 \left[1.284 + 4(10.259) + 2(7.232) + 5.419 \right]$$

$$= 0.03 \left[1.284 + 41.036 + 14.464 + 5.419 \right]$$

$$= 0.03 \left[58.324 \right]$$

$$= 1.7497 \quad \text{ANSWER}$$