

Question 2

Use M_4 to approximate

$$\int_0^2 e^{-x^2} dx.$$

Give the exponential form and a decimal.

Question 2 – Solution

Step 1: Find the width.

$$h = \frac{2 - 0}{4} = 0.5.$$

Step 2: Find the four midpoints.

$$0.25, \quad 0.75, \quad 1.25, \quad 1.75.$$

Step 3: Apply the midpoint formula.

$$\begin{aligned} M_4 &= h \sum_{i=1}^4 f(m_i) \\ &= 0.5 \left(e^{-(0.25)^2} + e^{-(0.75)^2} + e^{-(1.25)^2} + e^{-(1.75)^2} \right). \end{aligned}$$

Step 4: Evaluate.

$$M_4 \approx 0.88278895.$$

$M_4 \approx 0.8828$