

Last Name: SOLUTIONS

First Name: _____

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Quiz 8

Question 1. (5 marks) Evaluate the following limit:

$$\lim_{x \rightarrow \infty} \frac{\ln(x-10)}{\ln(4x+1)} = \text{l.f. } \frac{\infty}{\infty} \stackrel{(H)}{=} \lim_{x \rightarrow \infty} \frac{\frac{1}{x-10}}{\frac{4}{4x+1}} = \lim_{x \rightarrow \infty} \frac{4x+1}{4x-40}$$

$$= \text{l.f. } \frac{\infty}{\infty} \stackrel{(H)}{=} \lim_{x \rightarrow \infty} \frac{4}{4} = \frac{4}{4} = 1$$

Question 2. (5 marks) Use the trapezoidal rule with $n = 4$ to approximate the value of:

$$\int_0^2 e^{-x^2} dx \quad \Delta x = \frac{2-0}{4} = \frac{1}{2}$$

$$x_0 = 0, x_1 = 0.5, x_2 = 1, x_3 = 1.5, x_4 = 2$$

$$\therefore \int_0^2 e^{-x^2} dx \approx \frac{0.5}{2} \left[e^{-0^2} + 2e^{-(0.5)^2} + 2e^{-(1)^2} + 2e^{-(1.5)^2} + e^{-(2)^2} \right]$$

$$\approx 0.25 \left[1 + 2e^{-0.25} + 2e^{-1} + 2e^{-2.25} + e^{-4} \right]$$

$$\approx 0.25 \left[3.522474536 \right]$$

$$\approx 0.8806186341$$