MTH102 Tutorial 01
Calculus review

Question 1

Compute the following series:

$$\sum_{k=1}^{n} \frac{k}{2},\ \sum_{k=1}^{\infty} \frac{1}{3} \cdot \left(\frac{2}{3}\right)^k,\ \sum_{k=1}^{\infty} \frac{2}{k(k+1)},\ \sum_{k=1}^{\infty} \frac{2^k}{k!}.$$

Question 2

Compute the derivatives of the following functions:

$$f(x) = xe^{-2x},\ g(x) = e^{-\frac{(x-\mu)^2}{2\sigma^2}}.$$

Question 3

Compute the following definite integrals:

$$\int_0^1 xe^{-\frac{x^2}{2}}dx,\ \int_0^\infty xe^{-2x}dx.$$

Question 4

Compute the following double integrals.

(a)

$$\iint_D x(1-y)dxdy,$$

where $D = \{(x, y) : x \geq 0,\ y \geq 0,\ x + y \leq 1\}$.

(b)

$$\iint_D (4x + 3y)dxdy,$$

where $D = \{(x, y) : 0 \leq x \leq 1,\ 0 \leq y \leq 2x^2\}$.