

Session 2 Questions

Q1- Evaluate the following limits:

$$(a) \lim_{x \rightarrow 5} x^2 + 2x + 3$$

$$(b) \lim_{x \rightarrow 0} \frac{x^2 + x}{x}$$

$$(c) \lim_{x \rightarrow 2} \frac{7x - 14}{x^2 - 4x + 4}$$

$$(d) \lim_{x \rightarrow -3} \frac{6x + 18}{(x + 4)(x + 3)}$$

Q2- Let

$$f(x) = \begin{cases} x & \text{for } x < 0 \\ x - 2 & \text{for } x \geq 0 \end{cases}$$

Evaluate $\lim_{x \rightarrow 2} f(x)$ and $\lim_{x \rightarrow 0} f(x)$.

Q3- Find $\frac{df}{dx}$ if (a) $f(x) = x^2 + 2x + 4$.

$$(b) f(x) = x^3$$

Q4- Find ∇f if $f(x, y) = x^3 + 2x^2 + 3x^2y + 3xy + 4$.

Q5- Find ∇f if $f(x, y, z) = x + y + z^2x$

Q6- Find the derivative of sigmoid function.

(Assume that $\lim_{h \rightarrow 0} \frac{e^h - 1}{h} = 1$)

Q7- Find $\frac{d}{dx} \left(\frac{x^3 + 3}{x^5 + 2x^2} \right)$ using quotient rule.