3(a) In last class

Analysis I ← $\boxed{\lim_{n\to\infty}} f(-3+\frac{1}{n}) = \boxed{\infty}$ → Analysis – I

Keep in mind in

Right hand limit "$\lim_{h\to 0^+} f(-3+h)$"

$\lim_{n\to\infty} f(-3-\frac{1}{n}) = -\infty$

Left hand limit "$\lim_{h\to 0^-} f(-3+h)$"

Assume This today

$\lim_{n\to\infty} f(5+\frac{1}{n}) = \infty$

$\lim_{n\to\infty} f(5-\frac{1}{n}) = -\infty$

3 (b)

Assume

3 (b) :-

· Observation :-
[NOT VERIFIED]

3(a) $\Rightarrow$ f is not continuous at $-3, 5$

$\Rightarrow$ f is not differentiable at $-3, 5$

Ex ?

$\Rightarrow$ f' is not differentiable at $-3, 5$

$\boxed{f' \text{ is not defined at } -3, 5}$

$x \notin \{-3, 5\}$

$$f(x) = \frac{x}{(x+3)(x-5)}$$

$$= \frac{3}{8} \cdot \frac{1}{x+3} + \frac{5}{8} \frac{1}{x-5}$$

$x \in [a, b]$ $\quad 0 \notin [a, b]$

Assume :- $g(x) = x^m$ $\quad m \in \mathbb{Z}$

$$g'(x) = m x^{m-1}$$

Sum Rule | Quotient Rule / Product rule

XII
class

$$f'(x) = \frac{3}{8}(-1)\left(\frac{1}{x+3}\right)^2 + \frac{5}{8}(-1)\left(\frac{1}{x-5}\right)^2 \qquad x \notin \{-3, 5\}$$

$$f''(x) = \frac{3}{8}\,2\left(\frac{1}{x+3}\right)^3 + \frac{5}{8}\,2\left(\frac{1}{x-5}\right)^3$$

3 ⓒ

$$f(x) = \begin{cases} \frac{x}{(x+3)(x-5)} & x \in \mathbb{R} \setminus \{-3, 5\} \\ 0 & x \in \{-3, 5\} \end{cases}$$

Zeroes of f

Let $x \in \mathbb{R} \setminus \{-3, 5\}$

$$f(x) = 0 \iff \frac{x}{(x-3)(x+5)} = 0 \iff \frac{x(x+3)(x-5)}{(x+3)(x-5)} = 0\,(x+3)(x-5)$$

$\iff x = 0$

Let $x \in \{-3, 5\}$

By definition of f, $f(x) = 0$ at $x = \{-3, 5\}$

$\Rightarrow$ Zeroes of f: $x = -3, 0, 5$