

## Assignment # 02

(in hard form)

Note: Submit your assignments to GR on ~~18/11/20~~ <sup>19/11</sup> 19/11/2020.  
late submission will be rejected.

Q1. Find the limit. If it exists. If the limit does not exist then explain why?

(i)  $\lim_{x \rightarrow 0.5} \frac{2x-1}{|2x^3-x^2|}$  (ii)  $\lim_{x \rightarrow 0} \left( \frac{1}{x} - \frac{1}{|x|} \right)$

(iii)  $\lim_{x \rightarrow 4} \frac{\sqrt{8-x} - 2}{\sqrt{5-x} - 1}$  (iv) ~~Find the limit of f(x) as x approaches 1~~

(iv) Find  $\lim_{x \rightarrow 1} f(x)$  where  $f(x) = \begin{cases} x^2+1 & \text{if } x < 1 \\ (x-2)^2 & \text{if } x \geq 1 \end{cases}$

Q2: Find the values of a and b that make f continuous everywhere then find the derivative of f at ~~x=2~~ <sup>x=3</sup>.

$$f(x) = \begin{cases} \frac{x^2-4}{x-2} & \text{if } x < 2 \\ ax^2-bx+3 & \text{if } 2 \leq x < 3 \\ 2x-a+b & \text{if } x \geq 3 \end{cases}$$

Q3: let  $g(x) = \begin{cases} 2x-x^2 & \text{if } 0 \leq x < 2 \\ 2-x & \text{if } 2 < x \leq 3 \\ x-4 & \text{if } 3 < x < 4 \\ \pi & \text{if } x \geq 4 \end{cases}$

For each of the numbers 2, 3, and 4, discover whether  $g$  is continuous from left, continuous from right or continuous ~~from~~ at the number.

Q4 (i) Find the number  $a$  and  $b$

Such that 
$$\lim_{x \rightarrow 0} \frac{\sqrt{ax+b} - 2}{x} = 1$$

(ii) Find ~~the~~ all values of  $a$  such that  $f$  is continuous on  $\mathbb{R}$ .

$$f(x) = \begin{cases} x+1 & \text{if } x \leq a \\ x^2 & \text{if } x > a \end{cases}$$

Q5:- Find the Equation of tangent and Normal line to the curve at the given points.

(i)  $y = \sqrt{x}$   $P(1, 1)$ .

(ii)  $y = \frac{2x+1}{x+2}$   $P(1, 5)$ .