

# Mathematics Department

## MATH1411 - Worksheet #2

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. Name: \_\_\_\_\_

Q1 Find the following limits

$$\textcircled{1} \lim_{x \rightarrow 2^-} \frac{|x-2|}{x-2}$$

$$\textcircled{4} \lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1} - 1}$$

$$\textcircled{2} \lim_{x \rightarrow 2} \sqrt{4-x^2}$$

$$\textcircled{5} \lim_{x \rightarrow 0} \frac{|x|}{x}$$

$$\textcircled{3} \lim_{x \rightarrow 3} \frac{(x-1)^4 - 16}{x-3}$$

Q2 Assume  $1 + 2\cos x \leq f(x) - 1 \leq 2 + \frac{\sin x}{x}$   
for all value of  $x$  except  $x=0$ , Then  $\lim_{x \rightarrow 0} f(x) ??$

Q3 Find the continuous extension for  $f(x) = \frac{2x}{x^2-x}$  at  $x=0$

Q4 Find the asymptotes of the function  $f(x) = \frac{x^2}{x^2-1}$

Short answer - Worksheet #2

Q1  $\textcircled{1} -1$

$\textcircled{2} \text{D.N.E}$

$\textcircled{3} 32$

$\textcircled{4} 2$

$\textcircled{5} \text{D.N.E}$

Q2  $\lim_{x \rightarrow 0} f(x) = 4$

Q

$$Q_3: f(x) = \frac{2x}{x^2-x}, \quad \boxed{x \neq 0, x \neq 1}$$

Note

$$f(x) = \begin{cases} \frac{2x}{x^2-x} & x \neq 0 \\ -2 & x = 0 \end{cases}$$

$x=0$  removable Discant.  
 $x=1$  Vertical Asy.

$$Q_4 \quad f(x) = \frac{x^2}{x^2-1}$$

H. Asy  $\longrightarrow$   $\boxed{y=1}$

O. Asy  $\longrightarrow$  None

V. Asy  $\longrightarrow$   $\boxed{x=1}$  and  $\boxed{x=-1}$