Total = ~~11 ma~~ 12 marks

Nama:

No. Kad Matriks:

Kumpulan Tutorial:

Solution

Q1   Evaluate the following limits or explain why they do not exist.

(i) $\lim\limits_{x \to 2} \dfrac{x^2 - 4}{x^2 - x - 2}$

Solution

$\lim\limits_{x \to 2} \dfrac{x^2 - 4}{x^2 - x - 2} = \lim\limits_{x \to 2} \dfrac{(x-2)(x+2)}{(x+1)(x-2)}$. Since $x \to 2 \Rightarrow x \neq 2$. Hence

$\lim\limits_{x \to 2} \dfrac{(x-2)(x+2)}{(x+1)(x-2)} = \lim\limits_{x \to 2} \dfrac{x+2}{x+1} = \dfrac{\lim\limits_{x \to 2} x + 2}{\lim\limits_{x \to 2} x + 1} = \dfrac{4}{3}$

(3 marks)

~~(2 mar)~~

(ii) $\lim\limits_{x \to 0} f(x)$ if $f(x) = \dfrac{|x|}{x}$

Solution:

$\lim\limits_{x \to 0^+} \dfrac{|x|}{x} = \lim\limits_{x \to 0^+} \dfrac{x}{x} = \lim\limits_{x \to 0^+} 1 = 1;$ (1 mark)

$\lim\limits_{x \to 0^-} \dfrac{|x|}{x} = \lim\limits_{x \to 0^-} \dfrac{-x}{x} = \lim\limits_{x \to 0^-} (-1) = -1$ (1 mark)

Since $\lim\limits_{x \to 0^+} \dfrac{|x|}{x} \neq \lim\limits_{x \to 0^-} \dfrac{|x|}{x}$, we conclude that $\lim\limits_{x \to 0} \dfrac{|x|}{x}$ does not exist.   (1 mark)

[3 mar

Q2. Fill up the domain and range of the hyperbolic functions in the table:

	Domain	Range
cosh x	$\mathbb{R}$ ℝ real numbers	$[1, \infty)$
tanh x	$\mathbb{R}$	$(-1, 1)$
coth x	$\mathbb{R} \setminus \{0\}$	$(-\infty, -1) \cup (1, \infty)$

$(1 + \partial) f(1+1) + (1+1) = 6$ marks