

Calculus for the Life Science I
MAT1330A , MAT1330B, MAT1330E
Assignment 3

Due date: Oct. 7

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DGD (circle one): 1 , 2 , 3 , 4

Student Name (printed): _____

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Question 1

To estimate the limit $\lim_{x \rightarrow 0} f(x)$, where $f(x) = \frac{e^x - 1 - x}{x^2}$, one may use sequences of numerical values for x approaching 0.

a) Give two sequences to estimate the limit. A few terms for each sequence is enough.

x_n	$f(x_n)$		x_n	$f(x_n)$
		and		

b) We may conclude that $\lim_{x \rightarrow 0} f(x) =$.

Question 2

Does the limit $\lim_{x \rightarrow 2} \frac{|x - 2|}{x - 2}$ exist? Answer :

Justify your answer in one line.

Question 3

What is the value of the limit $\lim_{x \rightarrow 1} \frac{x - 1}{x^2 - 6x + 5}$? Answer :

Justify your answer without using sequences of numerical values for x .

Question 4

We consider the function

$$f(x) = \begin{cases} 0 & \text{if } x \in \mathbb{Q} \\ x^2 & \text{if } x \notin \mathbb{Q} \end{cases}$$

a) Is the function f continuous at $x = 0$? Answer :

Justify your answer in one line.

b) Does the derivative of f exist at $x = 0$? Answer :

Justify your answer in one line.

Note : Try to visualize the graph of f in your mind. Is it a nice continuous curve?