

Math 131 - Quiz 1

January 23, 2020

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due no later than 3:15pm on January 28.

1. (2.5 points) Use a table of values to estimate the following limit. Your table must show function values at six or more points. (Be in radian mode!)

$$\lim_{x \rightarrow 0} \frac{\tan 2x}{5x \cos 7x}$$

x	$f(x) = \frac{\tan 2x}{5x \cos 7x}$
0.1	0.53007
-0.1	0.53007
0.01	0.40104
-0.01	0.40104
0.001	0.40001
-0.001	0.40001

IT LOOKS LIKE

$$\lim_{x \rightarrow 0} \frac{\tan 2x}{5x \cos 7x} = 0.4$$

2. (2.5 points) Use a table of values to estimate the following limit. Your table must show function values at six or more points.

$$\lim_{x \rightarrow 3} \frac{e^{x^2} - e^9}{x - 3}$$

x	$f(x) = \frac{e^{x^2} - e^9}{x - 3}$
3.01	50192.718
2.99	47112.371
3.0001	48633.908
2.9999	48603.111
3.000001	48618.658
2.999999	48618.350

IT LOOKS LIKE

$$\lim_{x \rightarrow 3} \frac{e^{x^2} - e^9}{x - 3} \text{ IS ABOUT}$$

48618.5

(THE ACTUAL LIMIT IS

$$6e^9 \approx 48618.5035654523)$$

3. (2.5 points) We discussed four common ways a limit can fail to exist. In which of the four ways does the following limit fail to exist? Briefly explain your reasoning.

x	$f(x) = \frac{(5x^2 + 6) x }{2x}$
0.1	3.025
-0.1	-3.025
0.01	3.00025
-0.01	-3.00025

$$\lim_{x \rightarrow 0} \frac{(5x^2 + 6)|x|}{2x}$$

LIMIT FROM LEFT
 \neq
 LIMIT FROM RIGHT

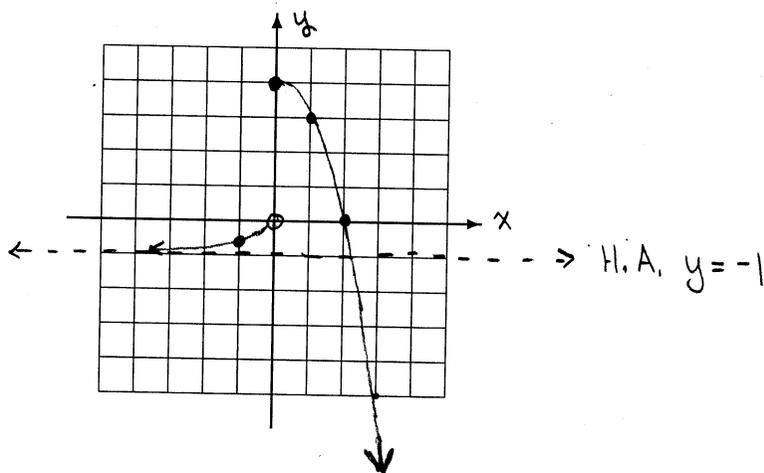
IT LOOKS LIKE

$$\lim_{x \rightarrow 0^+} f(x) = 3 \text{ AND}$$

$$\lim_{x \rightarrow 0^-} f(x) = -3$$

4. (2.5 points) Carefully sketch the graph of the following piecewise-defined function. Then use your graph to find each limit. Provide a short explanation for each answer.

$$f(x) = \begin{cases} e^x - 1, & x < 0 \\ 4 - x^2, & x \geq 0 \end{cases}$$



(a) $\lim_{x \rightarrow 0} f(x)$

DNE

$$\lim_{x \rightarrow 0^-} f(x) = 0 \neq \lim_{x \rightarrow 0^+} f(x) = 4$$

(b) $\lim_{x \rightarrow 2} f(x) = 0$