Math 131 - Quiz 1

August 26, 2020

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due on August 31.

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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.

$f(x) = \dfrac{\sqrt{x} - \sqrt{5}}{2x - 10}$

$$\lim_{x \to 5} \frac{\sqrt{x} - \sqrt{5}}{2x - 10}$$

X	f(x)
4.9	0.11237
5.1	0.11125
4.99	0.11186
5.01	0.11175
4.999	0.11181
5.001	0.11180

IT LOOKS LIKE

$$\lim_{x \to 5} \frac{\sqrt{x} - \sqrt{5}}{2x - 10} \approx 0.1118$$

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. (Make sure your calculator is in radian mode.)

$$\lim_{x \to 1} \frac{\sin(3x - 3)}{7\tan(2x - 2)}$$

$f(x) = \dfrac{\sin(3x-3)}{\tan(2x-2)}$

X	f(x)
0.9	0.20826
1.1	0.20826
0.99	0.21423
1.01	0.21423
0.999	0.21429
1.001	0.21429

IT LOOKS LIKE

$$\lim_{x \to 1} \frac{\sin(3x-3)}{7\tan(2x-2)} \approx 0.21429$$

3. (2 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.

$$\lim_{x\to -2} \sqrt{2x+4}$$

THE FUNCTION $f(x) = \sqrt{2x+4}$ IS NOT DEFINED WHEN $x < -2$. THE LIMIT DNE BECAUSE $f(x)$ IS NOT DEFINED ON AN INTERVAL AROUND $x = -2$.

(THIS IS FAILURE #4 IN THE LECTURE NOTES.)

4. (3 points) Explain why the limit laws cannot be used to evaluate the following limit. Then use a table of values to estimate the limit.

$$\lim_{x\to 2} \frac{2x^2 - 2x - 4}{x - 2}$$

THE LIMIT OF THE DENOMINATOR IS ZERO:

$\lim_{x\to 2} (x-2) = 0$. THE LIMIT LAWS DO NOT APPLY.

$f(x) = \dfrac{2x^2-2x-4}{x-2}$

x	$f(x)$
1.9	5.8
2.1	6.2
1.99	5.98
2.01	6.02
1.999	5.998
2.001	6.002

IT LOOKS LIKE

$\lim_{x\to 2} \dfrac{2x^2-2x-4}{x-2} \approx 6$