

Math 131 - Quiz 1

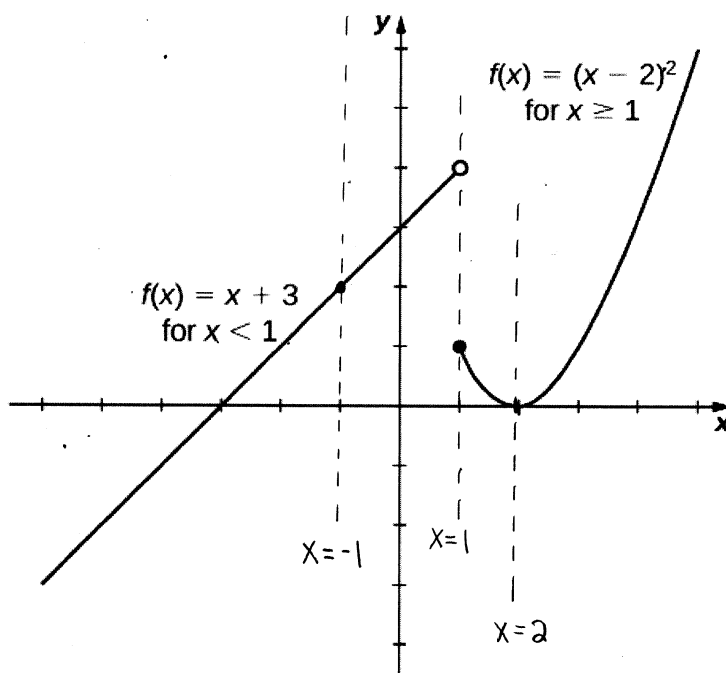
August 25, 2021

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due August 30 for section 001 and September 1 for section 950.

1. (3 points) The graph of the function f is shown below. Use the graph to estimate each limit. If the limit does not exist, explain why.



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

(b) $\lim_{x \rightarrow 1} f(x)$ DNE. THE LIMIT FROM THE LEFT IS 4, WHILE THE LIMIT FROM THE RIGHT IS 1.

(c) $\lim_{x \rightarrow -1} f(x) = 2$

2. (3 points) Use a table of values to estimate the following limit. Your table must show function values at six or more points.

x	$f(x) = \frac{5x}{1-e^{3x}}$
0.1	-1.42915
-0.1	-1.92915
0.01	-1.64179
-0.01	-1.69179
0.001	-1.66417
-0.001	-1.66917
0.0001	-1.666417
-0.0001	-1.666917

$$\lim_{x \rightarrow 0} \left(\frac{5x}{1-e^{3x}} \right)$$

IT LOOKS LIKE

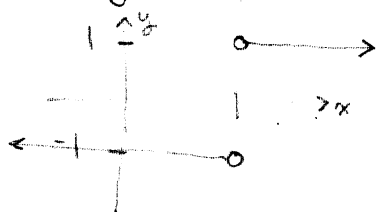
$$\lim_{x \rightarrow 0} \frac{5x}{1-e^{3x}} = -1.\overline{6}$$

3. (4 points) There are four common ways that limits can fail to exist. Each limit below does not exist. For each limit, describe the way in which it fails to exist.

(a) $\lim_{x \rightarrow 10} \frac{x-10}{|x-10|}$

$f(x) = \frac{x-10}{|x-10|}$ THE GRAPH OF f LOOKS LIKE THIS

FAILURE #1



LIMIT FROM LEFT AT $x=10$ IS NOT EQUAL TO LIMIT FROM RIGHT.

(b) $\lim_{x \rightarrow 0} \frac{5x}{\ln x}$

FAILURE #4

$\ln x$ IS NOT DEFINED FOR $x < 0$.

(c) $\lim_{x \rightarrow 7} \frac{3x^2+5}{(x-7)^2}$

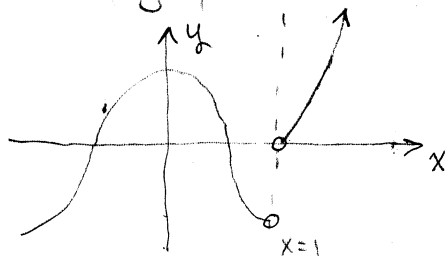
THE GRAPH OF $f(x) = \frac{3x^2+5}{(x-7)^2}$ HAS A VERT. ASYMP. AT $x=7$.

FAILURE #2

(d) $\lim_{x \rightarrow 1} f(x)$ where $f(x) = \begin{cases} \cos \pi x, & x < 1 \\ x^2 - 1, & x > 1 \end{cases}$

FAILURE #1

THE GRAPH OF f LOOKS LIKE THIS



LIMIT FROM LEFT AT $x=1$ IS NOT EQUAL TO LIMIT FROM RIGHT.