Math 131 - Quiz 1

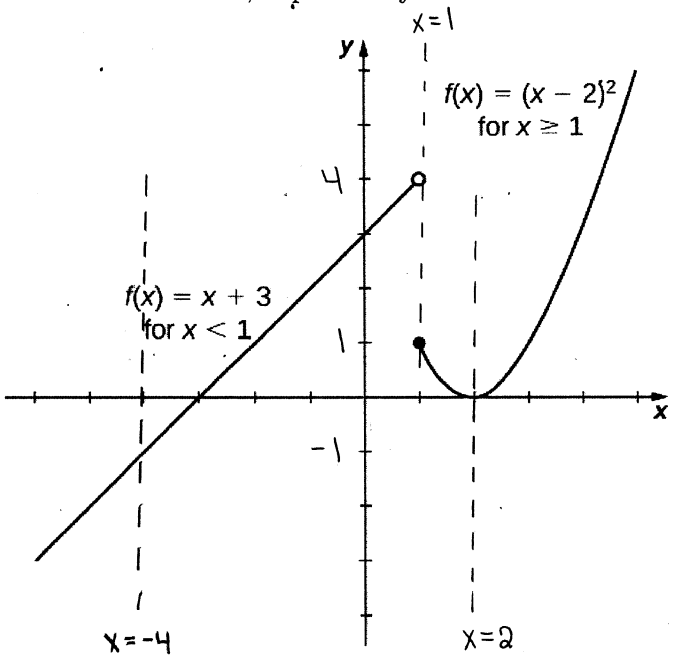
August 19, 2026

Name key

Score _____

Show all work to receive full credit. Supply explanations where necessary. This quiz is due August 24.

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) $\lim_{x \to -4} f(x)$

$= -1$

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

(c) $\lim_{x \to 1} f(x)$ DNE

$\lim_{x \to 1^-} f(x) = 4$ BUT $\lim_{x \to 1^+} f(x) = 1$

ONE-SIDED LIMITS EXIST BUT ARE NOT EQUAL.

THE ACTUAL LIMIT IS $\frac{5}{21}$.

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

$$\lim_{x\to 1} \frac{\tan(5x-5)}{7\sin(3x-3)}$$

$f(x) = \dfrac{\text{TAN}(5x-5)}{7\,\text{SIN}(3x-3)}$

IT LOOKS LIKE THE LIMIT IS ABOUT 0.2381.

x	0.9	0.99	0.999	0.9999	1.1	1.01	1.001
f(x)	0.26409	0.23833	0.23810	0.23810	0.26408	0.23833	0.23810

3. (4 points) Think about the 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. Show work to support your answer.

(a) $\lim_{x\to 5} \dfrac{x+5}{(2x-10)^2}$

x	f(x)
5.1	252.5
5.01	25025
5.001	2500250

x	f(x)
4.9	247.5
4.99	24975
4.999	2499750

LOOKS LIKE LIMIT DNE BECAUSE f(x) GROWS W/O BOUND AS $x \to 5$

(b) $\lim_{x\to 0} \dfrac{x^3-6x}{|x|}$

x	f(x)
0.1	-5.99
0.01	-5.9999
0.001	-5.999999

x	f(x)
-0.1	5.99
-0.01	5.9999
-0.001	5.999999

LIMIT DNE BECAUSE $\lim_{x\to 0^-} f(x) = 6 \neq \lim_{x\to 0^+} f(x) = -6$

(c) $\lim_{x\to 1} \dfrac{\ln(x-1)}{5x}$

$\ln(x-1)$ IS NOT DEFINED FOR $x < 1$. LIMIT CANNOT EXIST.

f(x) IS NOT DEFINED ON BOTH SIDES OF LIMIT POINT.

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

x	f(x)
0.9	-0.95106
0.99	-0.99951
0.999	-0.9999951

x	f(x)
1.1	0.21
1.01	0.0201
1.01	0.002001

LIMIT DNE BECAUSE $\lim_{x\to 1^-} f(x) = -1 \neq \lim_{x\to 1^+} f(x) = 0$