

Math 131 - Quiz 1

January 21, 2026

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due January 26.

1. (2 points) Use a table of numerical values to estimate $\lim_{x \rightarrow 4} f(x)$. Your table must show function values at six or more points.

x	f(x)
3.9	29.468943
3.99	30.840693
3.999	30.984007
3.9999	30.998400
4.1	31.705171
4.01	31.070050
4.001	31.007001
4.0001	31.000700

$$f(x) = \begin{cases} 2x^2 - \cos(\pi x), & x < 4 \\ 6(x+1) + e^{x-4}, & x > 4 \end{cases}$$

IT LOOKS LIKE

$$\lim_{x \rightarrow 4} f(x) = 31$$

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

Let $f(x) = \frac{\tan(x-3)}{5x-15}$

x	f(x)
2.9	0.200669
2.99	0.200007
2.999	0.200000
3.1	0.200669
3.01	0.200007
3.001	0.200000

$$\lim_{x \rightarrow 3} \frac{\tan(x-3)}{5x-15}$$

IT LOOKS LIKE

$$\lim_{x \rightarrow 3} \frac{\tan(x-3)}{5x-15} = 0.2$$

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

Let $f(x) = \frac{|x^2-1|}{x+1}$

x	f(x)
-1.1	-2.1
-1.01	-2.01
-1.001	-2.001
-0.9	1.9
-0.99	1.99
-0.999	1.999

$$\lim_{x \rightarrow -1} \frac{|x^2-1|}{x+1}$$

IT LOOKS LIKE

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

WHILE

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

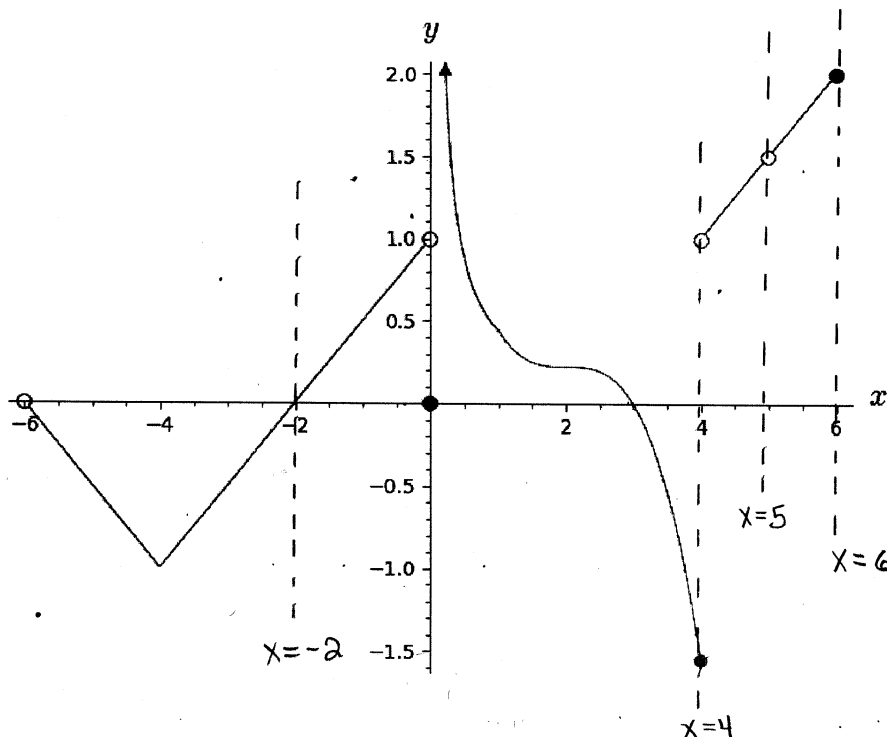
DIFFERENT
SIDED
LIMITS.

IT LOOKS LIKE

$$\lim_{x \rightarrow -1} \frac{|x^2-1|}{x+1} \text{ DOES NOT EXIST.}$$

Turn over.

4. (2 points) Referring to the graph of $y = f(x)$ shown below, determine each of the following or explain why it does not exist. (To explain why a limit DNE, use one of the reasons from the Lecture 3 notes.)



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

(b) $\lim_{x \rightarrow 6} f(x)$ DNE

$\lim_{x \rightarrow 6^-} f(x) = 2$, BUT x CANNOT APPROACH 6 FROM THE RIGHT.

(c) $\lim_{x \rightarrow 5} f(x) = 1.5$

(d) $\lim_{x \rightarrow 4} f(x)$ DNE

$\lim_{x \rightarrow 4^-} f(x) = -1.5 \neq \lim_{x \rightarrow 4^+} f(x) = 1$

5. (2 points) Find the limit analytically by using limit laws. Show how you use the limit laws.

$$\lim_{x \rightarrow 3} (x^2 - 6x)$$

$$= \left(\lim_{x \rightarrow 3} x \right)^2 - 6 \lim_{x \rightarrow 3} x$$

$$= 3^2 - 6(3) = 9 - 18 = -9$$

I USED LIMIT LAWS 3, 8, 5, AND 2.