

Math 131 - Assignment 1

January 22, 2025

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due January 29.

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

$$\lim_{x \rightarrow 0} \frac{1 - \cos(\pi x)}{\pi x^2}$$

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

$$\lim_{x \rightarrow 7} \frac{2x + 1}{(7 - x)^2}$$

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

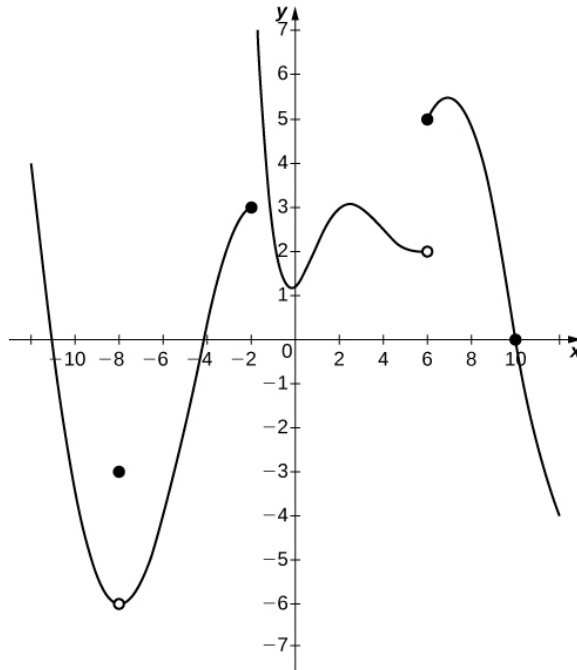
$$\lim_{x \rightarrow 2} \frac{|10 - 3x - x^2|}{x - 2}$$

4. Sketch a good graph of $f(x) = 2x - 4$. Then use your graph to determine $\lim_{x \rightarrow 2} f(x)$.

5. Carefully explain why the limit does not exist: $\lim_{x \rightarrow 0} x \ln x$.

Turn over.

6. Referring to the graph of $y = f(x)$ shown below, determine each of the following or explain why it does not exist.



- (a) $\lim_{x \rightarrow -4} f(x)$
 (b) $f(-2)$
 (c) $\lim_{x \rightarrow -8} f(x)$
 (d) $\lim_{x \rightarrow -2} f(x)$

7. Find the limit analytically by using limit laws. Show how you use the limit laws.

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

8. Suppose that

$$f(4) = -13, \quad \lim_{x \rightarrow 4} f(x) = 8, \quad g(4) = 9, \quad \lim_{x \rightarrow 4} g(x) = -6.$$

Use limit laws to find the limit below. Show how you use the limit laws.

$$\lim_{x \rightarrow 4} \left[\frac{f(x)}{x g(x)} \right]$$