# Math 131 - Assignment 1

Name _____

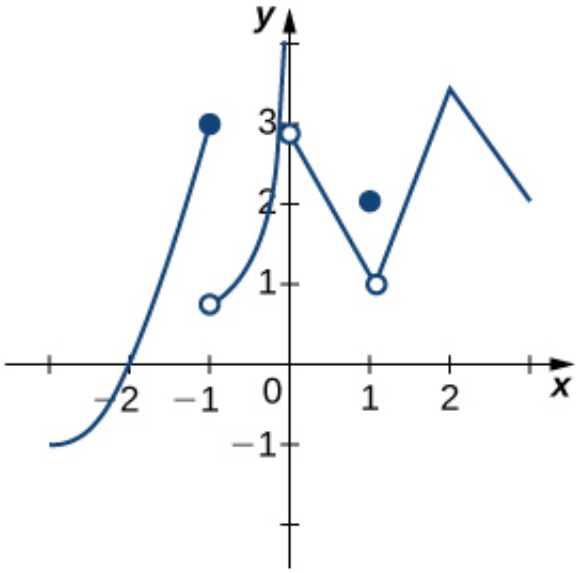
August 21, 2024

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due August 28.

---

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




(a) $f(1)$

(b) $\lim_{x \to 1} f(x)$

(c) $\lim_{x \to 2} f(x)$

(d) $\lim_{x \to -2} f(x)$

(e) $\lim_{x \to -1} f(x)$

(f) $f(0)$

*Turn over.*

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

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

3. For any nonzero real number $x$, let $f(x)$ be the leftmost nonzero digit of $x$ when $x$ is written in standard decimal form. Explain why $\lim_{x \to 0} f(x)$ does not exist, and give some supporting data (perhaps a table of values).

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

$$\lim_{x \to 2} \frac{x^2 + x - 6}{|x - 2|}$$

5. Referring to problem 4 (directly above), carefully explain why $x = 2$ should NOT be in your table of values.

6. Carefully explain why the limit does not exist: $\lim_{x \to -4} \sqrt{4 + x}$.

7. Find the limit analytically by using limit laws. Show all steps.

$$\lim_{x \to 4} \frac{x^2 - 6x + 3}{\sqrt{x}}$$