**Name_____ No Calculators. Present neatly. Score_____.**

1.

Let

$$f(x) = \begin{cases} x^2 + 1 & \text{if } x < 1 \\ (x - 2)^2 & \text{if } x \geqslant 1 \end{cases}$$

(a) Find $\lim_{x \to 1^-} f(x)$ and $\lim_{x \to 1^+} f(x)$.
(b) Does $\lim_{x \to 1} f(x)$ exist?
(c) Sketch the graph of $f$.

2. Evaluate the limit or explain why it does not exist.

$$\lim_{x \to -1} \frac{x^2 + 2x + 1}{x^4 - 1}$$

3. Evaluate the limit or explain why it does not exist.

$$\lim_{x \to 3} \left(2x + |x - 3|\right)$$

4. Evaluate the limit or explain why it does not exist.

$$\lim_{x \to -4} \frac{\dfrac{1}{4} + \dfrac{1}{x}}{4 + x}$$

5. Evaluate the limit or explain why it does not exist.

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

Your work: