

Name: \_\_\_\_\_

Math 231 Quiz 1

1. (5 pts) Let

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

Evaluate the following limits.

(a)  $\lim_{x \rightarrow -1} f(x)$       (b)  $\lim_{x \rightarrow 1^-} f(x)$       (c)  $\lim_{x \rightarrow 1^+} f(x)$       (d)  $\lim_{x \rightarrow 1} f(x)$       (e)  $\lim_{x \rightarrow 0} f(x)$

2. (5 pts) Find the domain of the function.

(a)  $f(x) = \frac{x + 1}{x^2 - 4}$       (b)  $g(x) = \sqrt{1 - \sqrt{x}}$

3. (5 pts) Compute the functions  $f \circ g$  and  $g \circ f$ . Simplify your answers.

$$f(x) = x^2 - 1, \quad g(x) = 2x + 1$$

4. (5 pts) Evaluate the limit and justify your answers.

(a)  $\lim_{x \rightarrow 1} [2(x + 1)^2 - x^4(x + 3)]$       (b)  $g(x) = \lim_{x \rightarrow -1} \frac{\sqrt[3]{x - 7}}{\sqrt{x^2 + 1}}$