CalculusBM | Name: | Quiz 1
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∗ **Note:** No points will be given if no arguments are provided for an answer.
Good Luck! $\sim\sim$ *Yuling* $\ddot{\smile}$

1. (10 points) Find the domain and range of the function
$$f(x) = \frac{x-2}{x+4}$$

2. (10 points) Determine whether the function $f(x) = |x+3|$ is one-to-one. If it is, find its inverse function.

3. (10 points) Find the inverse function of f, where $f(x) = \sqrt{9-x^2}, \quad 0 \le x \le 3$.

4. (10 points) Describe the interval(s) on which the function is continuous. If there are any discontinuities, determine whether they are removable.
$$f(x) = \begin{cases} x^2+1 & x < 0 \\ x-1 & x \ge 0 \end{cases}$$

5. (10 points) Find the constant a such that the function $f(x)$ is continuous on the entire real number line, where
$$f(x) = \begin{cases} x^3 & x \le 2 \\ ax^2 & x > 2 \end{cases}$$

6. (50 points) Find the indicated limit or show it does not exist. If the limiting value is infinite, indicate whether it is ∞ or $-\infty$.
$$(a)\ \lim_{x\to 2} \frac{x^2+3x-10}{x^2-4}, \quad (b)\ \lim_{\Delta t\to 0} \frac{(t+\Delta t)^2 - 5(t+\Delta t) - (t^2-5t)}{\Delta t},$$
$$(c)\ \lim_{x\to 0} \frac{\sqrt{x+5}-\sqrt{5}}{x}, \quad (d)\ \lim_{x\to -3^-} \frac{|x+3|}{x+3}, \quad (e)\ \lim_{x\to -2^+} \frac{3}{x^2-4}$$