Calculus AJ
Instructor: Yu-Ling Tseng Quiz 1 20161012

⋆ Answer and mark clearly the questions in the provided answer sheets.
Write down your name and student's ID on the each answer sheet you used.
∗ **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

$$f(x) = \frac{x+3}{x-1}$$

2. (10 points) Determine whether the function $f(x) = x^2 - x - 2$ is one-to-one.

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

4. (50 points) Find the indicated limit or show it does not exist. If the limiting value is infinite, indicate whether it is ∞ or $-\infty$.

$$(a)\ \lim_{x\to -2^-} \frac{x+2}{|x+2|}, \quad (b)\ \lim_{x\to 0^+} \left(x - \frac{1}{x}\right), \quad (c)\ \lim_{x\to 0} \frac{[1/(x-2)]-1}{x},$$

$$(d)\ \lim_{x\to 2} \frac{x-2}{x^2-4x+4}, \quad (e)\ \lim_{\Delta x\to 0} \frac{(x+\Delta x)^3-(x+\Delta x)-(x^3-x)}{\Delta x}$$

5. (10 points) Describe the interval(s) on which the function h is continuous, where

$$h(x) = f(g(x)), \quad f(x) = \frac{1}{\sqrt{x}}, \quad g(x) = x-1,\ x > 1.$$

Explain why h is continuous on the interval(s). If h has a discontinuity, identify the conditions of continuity that are not satisfied.

6. (10 points) Find the constants a and b such that the function $f(x)$ is continuous on the entire real number line, where

$$f(x) = \begin{cases} 2 & x \leq -1 \\ ax+b & -1 < x < 3 \\ -2 & x \geq 3 \end{cases}$$