Math 1300-005 - Spring 2017
Introduction to Continuity - 1/30/17

Guidelines: Please work in groups of two or three. Please show all work and clearly denote your answer.

1. Find the numbers, if any, at which the following functions are discontinuous. Explain your answer by showing which part of the definition of continuity the function fails to satisfy.

(a) $f(x) = \begin{cases} \dfrac{2x^2 - 5x - 3}{x - 3} & \text{if } x \neq 3 \\ 6 & \text{if } x = 3 \end{cases}$

(b) $g(x) = \begin{cases} x + 1 & \text{if } x < 0 \\ e^x & \text{if } 0 \leq x \leq 1 \\ 2 - x & \text{if } x > 1 \end{cases}$

2. For what value of the constant c is the function f continuous on $(-\infty, \infty)$?

$$f(x) = \begin{cases} cx^2 + 2x & \text{if } x < 2 \\ x^3 - cx & \text{if } x \geq 2 \end{cases}$$

3. Find the values of a and b that make g continuous on $(-\infty, \infty)$.

$$g(x) = \begin{cases} \dfrac{x^2 - 4}{x - 2} & \text{if } x < 2 \\ ax^2 - bx + 3 & \text{if } 2 \leq x < 3 \\ 2x - a + b & \text{if } x \geq 3 \end{cases}$$