Assignment 4: Continuity

Problem 1

Let $f : A \to \mathbb{R}$. State what it means for the function f to be continuous at the point $c \in A$.

Give an example of a function that is not continuous at $x = 5$ but is continuous everywhere else in $\mathbb{R}$.

Problem 2

At what points is the function $f(x) = \frac{x+3}{x^2-3x-10}$ discontinuous? What type of discontinuities does this function have?

Problem 3

Explain why each of these functions is not continuous at $x = 1$. Then graph the functions.

$f(x) = \frac{-1}{(x-1)^2}$

$g(x) = \begin{cases} 1 - x^2 & , x > 1 \\ \frac{1}{x} & , x \leq 1 \end{cases}$

Problem 4

Given that

$$f(x) = \begin{cases} \text{ax+3} & x \leq 4 \\ \frac{1}{x} & x > 4 \end{cases}$$

find a value for a that will make f continuous at $x = 4$.