MATH 1500
Assignment #1
Due: Tuesday, Sept. 30th

1. (10 marks) Evaluate the following limits, if they exist:

a) $\lim_{x\to 2}\dfrac{2x^2+1}{x^2+6x-4}$

b) $\lim_{t\to -1}(t^2+1)^3(t+3)^5$

c) $\lim_{u\to 3}\dfrac{u-3}{u^2-2u-3}$

d) $\lim_{h\to 0}\dfrac{\sqrt{1+h}-1}{h}$

e) $\lim_{r\to 0}\left(\dfrac{1}{r}-\dfrac{1}{r^2+r}\right)$

2. (5 marks) What is the value of the constant k that will make the following function continuous everywhere?

$$f(x)=\begin{cases}x^2-1 & \text{if } x<1\\ k-x & \text{if } x\geq 1\end{cases}$$

(HINT: pick a k so that the 3 rules will be satisfied)

3. (5 marks) Find the infinite limits (vertical asymptotes) and limits at infinity (horizontal asymptotes) of the following function by calculating all of the relevant limits. Draw a rough sketch.

$$f(x)=\frac{x-2}{x^2-4}$$