Math101 Name:

Quiz#2 ID No:

Serial No:

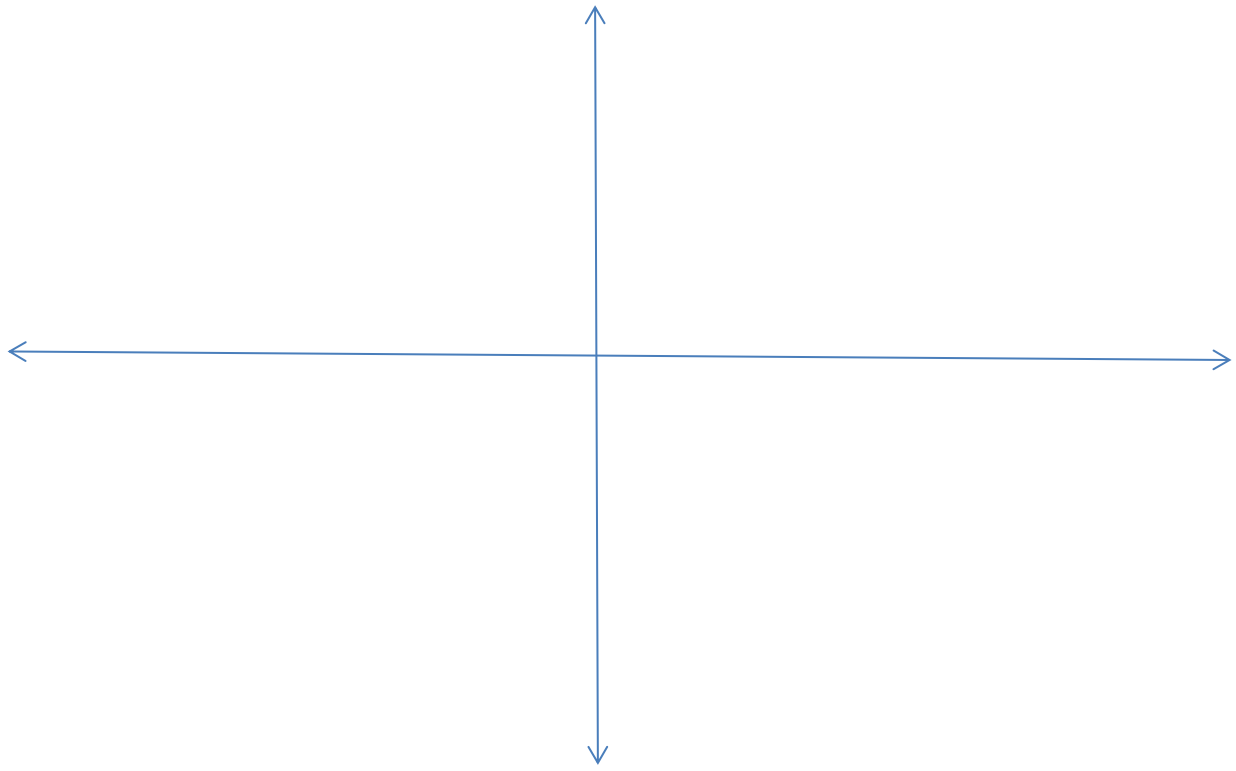
1- *Evaluate the limit if it exists,*

$$\lim_{x\to 1}\left(\frac{x^2-|x-1|-1}{|x-1|}\right)$$

2- *Sketch the graph of a function f that satisfies all of the following conditions:*

$\lim_{x\to -5^-} f(x) = -\infty$; $\lim_{x\to -5^+} f(x) = \infty$; $\lim_{x\to -\infty} f(x) = -2$; $\lim_{x\to -1} f(x) = 1$;

$f(x)$ is undefined at -5; *and $f(x)$ has a jump discontinuity at 3*



(a) Let $f(x) = \begin{cases} \frac{4a}{x+1} & if\ x > 1 \\ 4 & if\ x = 1 \\ a^2 & if\ x < 1 \end{cases}$, *Find the value(s) of a such that* $f(x)$ *is continuous everywhere.*

3- *Use the Intermediate Value Theorem to show that the equation* $x^3 - 3x - 1 = 0$ *has a solution.*

4- Given that $\lim_{x \to -1}(-3x - 2) = 1$ and $\epsilon = 0.03$. Find δ (the largest possible) that satisfies the condition given in the $\epsilon - \delta$ definition of a limit.