Math_101 **Quiz 1 Solutions**

Ex 1: a) $\lim\limits_{x\to 1} \dfrac{3x^2-2x-1}{2-x-x^2} = \lim\limits_{x\to 1} \dfrac{(3x+1)(x-1)}{-(x+2)(x-1)}$

$= \lim\limits_{x\to 1} -\dfrac{3x+1}{x+2} = -\dfrac{4}{3}$

b) $\lim\limits_{x\to 2} \dfrac{\sqrt{x+2}-x}{x-2} = \lim\limits_{x\to 2} \dfrac{(\sqrt{x+2}-x)(\sqrt{x+2}+x)}{(x-2)(\sqrt{x+2}+x)}$

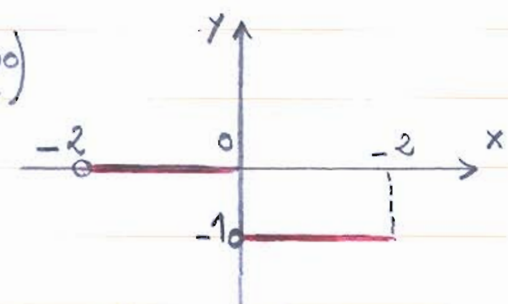
$= \lim\limits_{x\to 2} \dfrac{x+2-x^2}{(x-2)(\sqrt{x+2}+x)}$

$= \lim\limits_{x\to 2} -\dfrac{(x-2)(x+1)}{(x-2)(\sqrt{x+2}+x)} = \lim\limits_{x\to 2} -\dfrac{(x+1)}{\sqrt{x+2}+x} = -\dfrac{3}{4}$

Ex 2: 1°) a) If $-2 < x \leq 0$, then $0 \leq -x < 2$ and so $0 \leq -\dfrac{x}{2} < 1$. Hence $[\![-\dfrac{x}{2}]\!] = 0$.

b) If $0 < x \leq 2$, then $-2 \leq -x < 0$ and so $-1 \leq -\dfrac{x}{2} < 0$. Hence $[\![-\dfrac{x}{2}]\!] = -1$

2°)



$f(x) = 0$ for $-2 < x \leq 0$
$f(x) = -1$ for $0 < x \leq 2$

3°) $\lim\limits_{x\to 0^-} f(x) = 0$ and $\lim\limits_{x\to 0^+} f(x) = -1$

Since $\lim\limits_{x\to 0^-} f(x) \neq \lim\limits_{x\to 0^+} f(x)$, then $\lim\limits_{x\to 0} f(x)$ does not exist.