Recall this statement about limits from an earlier lesson

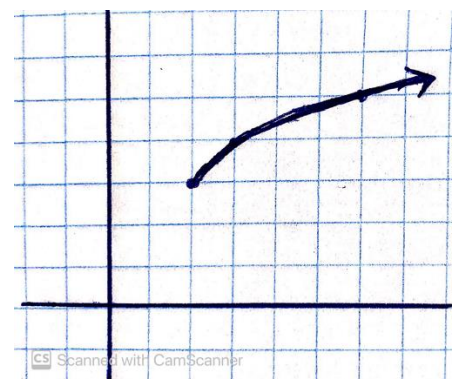| |
|---|
| If $\lim\limits_{x \to a^-} f(x) = b$ and if $\lim\limits_{x \to a^+} f(x) = b$ then $\lim\limits_{x \to a} f(x) = b$ |
| However, if $\lim\limits_{x \to a^-} f(x)$ exists and if $\lim\limits_{x \to a^+} f(x)$ exists but $\lim\limits_{x \to a^-} f(x) \neq \lim\limits_{x \to a^+} f(x)$, then $\lim\limits_{x \to a} f(x)$ does not exist. |

Example 1

Given that $f(x) = \begin{cases} -x - 3, & x \leq -1 \\ 3x, & x > -1 \end{cases}$, use a graphing approach to determine $\lim\limits_{x \to -1} f(x)$ or justify that it does not exist.
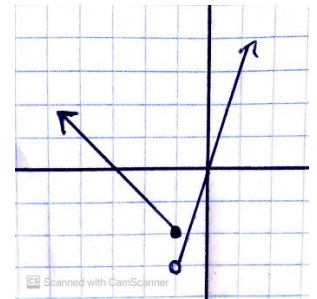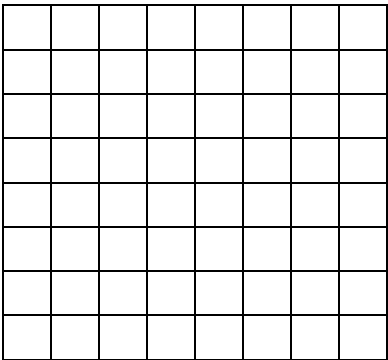

Example 2

Evaluate the following using a graphing approach

$$\lim_{x \to 2}(\sqrt{x - 2} + 3)$$

Example 3

Evaluate $\lim\limits_{x \to 0} |x|$
Example 4

Evaluate $\lim\limits_{x \to 4} \dfrac{|x-4|}{x-4}$