**Exercise 1** *Find*

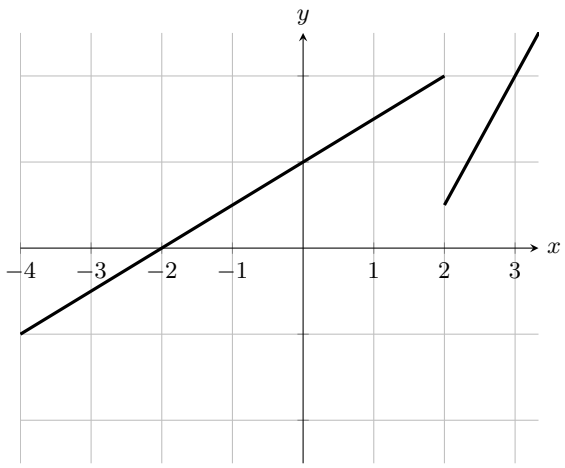
$$\lim_{x\to 2} f(x) = \boxed{DNE}.$$

*where*

$$f(x) = \begin{cases} x+2 & x \le 2, \\ 3x-5 & x > 2. \end{cases}$$

***Hint:*** *Both pieces of $f(x)$, $x+2$, for $x \le 2$, and $3x-5$, for $x > 2$, are continuous for all $x$. However, for the limit $\lim_{x\to 2} f(x)$ to exist, both the left-hand and the right-hand limits of $f(x)$ at 2 must exist and be equal.*

***Hint:*** *Take a look at the graph of the function*




***Hint:*** *Evaluating $\lim_{x\to 2^+} f(x)$ we see that it is equal to 1. This follows because, for $x > 2$, we are on the piece of $f(x)$ given by $3x-5$ and the limit $\lim_{x\to 2}(3x-5) = 3\cdot\lim_{x\to 2}(x) - \lim_{x\to 2}(5) = 1$, certainly. On the other hand, evaluating $\lim_{x\to 2^-} f(x)$ we see it is equal to 4. This follows because, for $x \le 2$, we are on the piece of $f(x)$ given by $x+2$ and the limit $\lim_{x\to 2}(x+2) = \lim_{x\to 2}(x) + \lim_{x\to 2}(2) = 4$, certainly. These are not equal, so $\lim_{x\to 2} f(x)$ does not exist.*