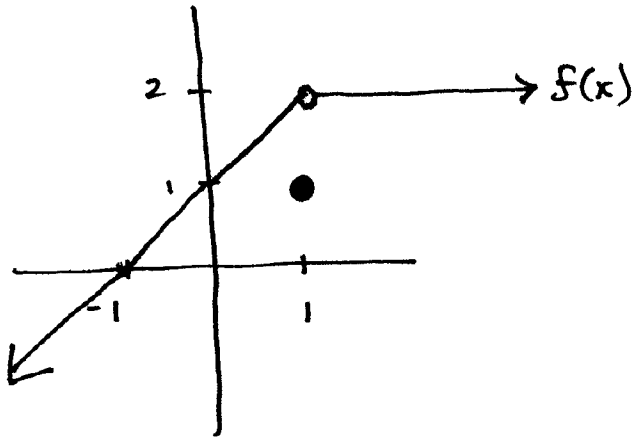


Limit - the y-value a function approaches

* the limit is not necessarily the value of the function at that x



$$\lim_{x \rightarrow 1^-} f(x) = 2 \quad \left. \vphantom{\lim_{x \rightarrow 1^-} f(x) = 2} \right\} \text{same}$$

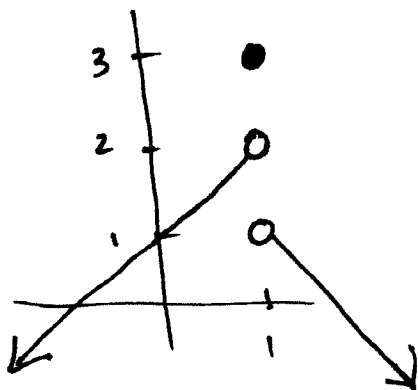
$$\lim_{x \rightarrow 1^+} f(x) = 2$$

$$\lim_{x \rightarrow 1} f(x) = 2$$

$$f(1) = 1$$

$$\lim_{x \rightarrow -1^-} f(x) = 0 \quad \left. \vphantom{\lim_{x \rightarrow -1^-} f(x) = 0} \right\} \text{same} \quad \lim_{x \rightarrow -1} f(x) = 0$$

$$\lim_{x \rightarrow -1^+} f(x) = 0 \quad f(-1) = 0$$



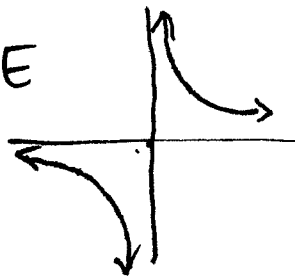
$$\lim_{x \rightarrow 1^-} f(x) = 2 \quad \left. \vphantom{\lim_{x \rightarrow 1^-} f(x) = 2} \right\} \text{not the same}$$

$$\lim_{x \rightarrow 1^+} f(x) = 1$$

$$\lim_{x \rightarrow 1} f(x) = \text{DNE}$$

$$f(1) = 3$$

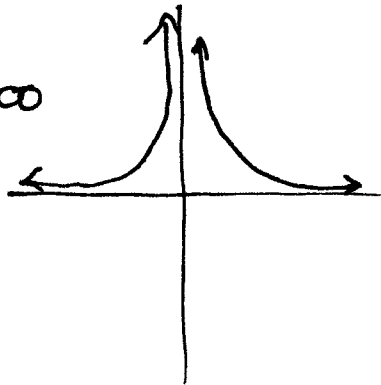
EX1 $\lim_{x \rightarrow 0} \frac{1}{x} = \text{DNE}$



$\lim_{x \rightarrow 0^-} \frac{1}{x} = -\infty$

$\lim_{x \rightarrow 0^+} \frac{1}{x} = \infty$

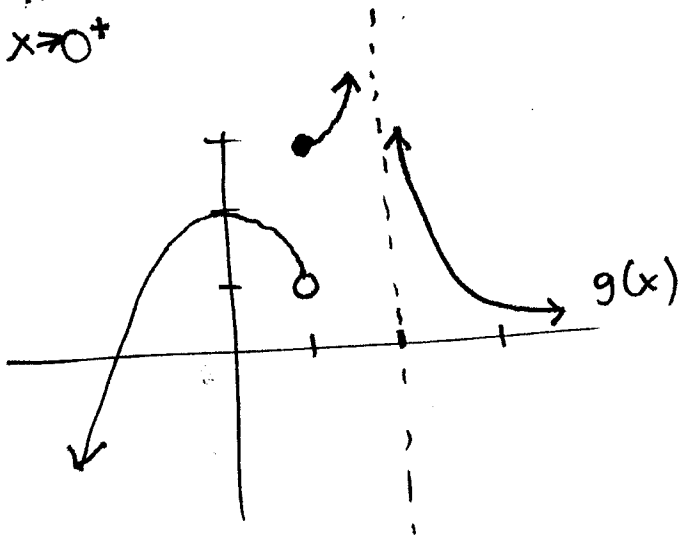
EX2 $\lim_{x \rightarrow 0} \frac{1}{x^2} = \infty$



$\lim_{x \rightarrow 0^-} \frac{1}{x^2} = \infty$

$\lim_{x \rightarrow 0^+} \frac{1}{x^2} = \infty$

EX3

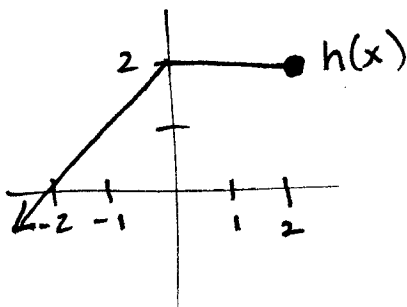


$\lim_{x \rightarrow 2} g(x) = \infty$

$\lim_{x \rightarrow 0} g(x) = 2$

$\lim_{x \rightarrow 1} g(x) = \text{DNE}$

EX4



$\lim_{x \rightarrow 2} h(x) = \text{DNE}$

(no right-sided limit)

EX5 Use a table: $\lim_{x \rightarrow 3} \frac{x-3}{x^2-9} \Rightarrow \frac{x-3}{(x-3)(x+3)} \approx .167$

x	2.9	2.99	2.999	3	3.001	3.01	3.1
y	.16694	.1669	.16666	-	.16666	.1663	.1639