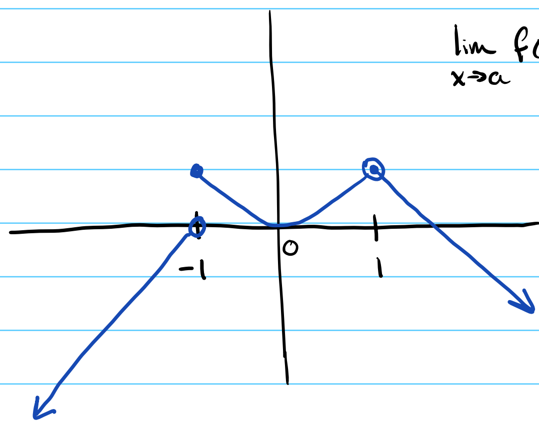
Recitation 2 solutions

1. (a) $\lim_{x\to 1^-} f(x) = 3$ (b) $\lim_{x\to 1} f(x)$ DNE (c) $\lim_{x\to 4} f(x) = +\infty$ (d) $\lim_{x\to -1} f(x) = 2$

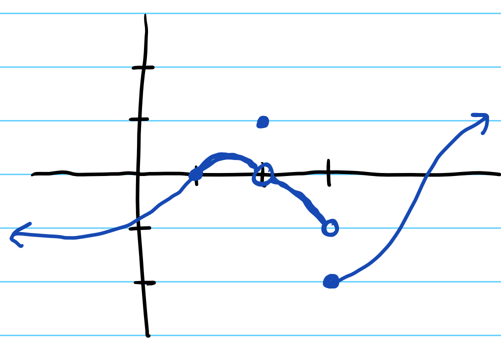
(e) $\lim_{x\to 2} f(x) = 1$ (f) $\lim_{x\to -\infty} f(x) = +\infty$

2.

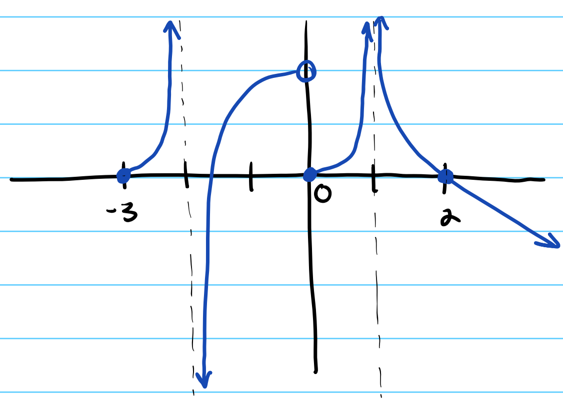


$\lim_{x\to a} f(x)$ exists for all values of a except for $a = -1$.

3.



4.



5. Since $|x| = \begin{cases} -x & \text{if } x<0 \\ x & \text{if } x \geq 0 \end{cases}$ we have $\lim_{x\to 0^-} \frac{|x|}{x} = \lim_{x\to 0^-} \frac{-x}{x} = \lim_{x\to 0^-} (-1) = -1$

but $\lim_{x\to 0^+} \frac{|x|}{x} = \lim_{x\to 0^+} \frac{x}{x} = \lim_{x\to 0^+} 1 = 1$

Since $\lim_{x\to 0^-} \frac{|x|}{x} \neq \lim_{x\to 0^+} \frac{|x|}{x}$, $\lim_{x\to 0} \frac{|x|}{x}$ DNE.