

Limits

Consider $f(x) = \frac{x+5}{x^2-25}$

$f(-5)$ does not exist

$f(5)$ dne

- What happens as x gets close to -5 ?

x	$f(x)$	
-4.9	-0.101010	} Approaching -5 from the right $\lim_{x \rightarrow -5^+} f(x) = -\frac{1}{10}$
-4.99	-0.1001001	
-4.999	-0.100010001	
-4.9999	-0.10000100001	
-5.1	-0.0990099	} approaching -5 from the left $\lim_{x \rightarrow -5^-} f(x) = -\frac{1}{10}$
-5.001	-0.09999...	

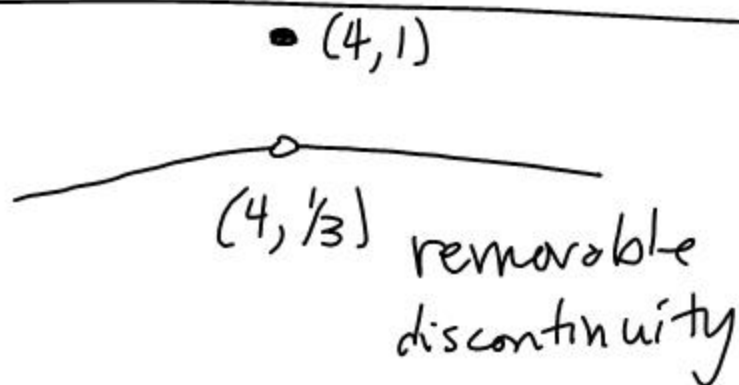
2-sided limit.

$$\lim_{x \rightarrow -5} f(x) = -\frac{1}{10}$$

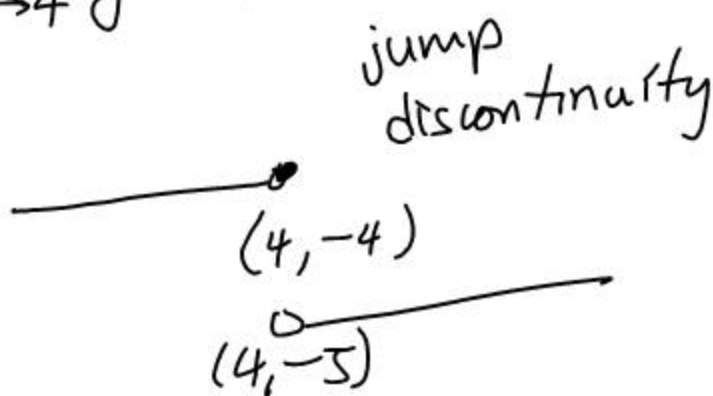
Now - do it by hand

$$\begin{aligned} \lim_{x \rightarrow -5} \frac{x+5}{x^2-25} &= \lim_{x \rightarrow -5} \frac{\cancel{x+5} \cdot 1}{(\cancel{x+5})(x-5)} \\ &= \frac{1}{-5-5} = -\frac{1}{10} \end{aligned}$$

(a) $\lim_{x \rightarrow 4} f(x) = \frac{1}{3}$
 $f(4) = 1$



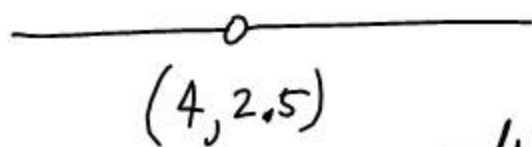
(b) $\lim_{x \rightarrow 4^-} g(x) = -4$
 $\lim_{x \rightarrow 4^+} g(x) = -5$ } $\lim_{x \rightarrow 4} g(x)$ does not exist



$$y = \frac{x}{|x+1|}$$



(#1c) $\lim_{x \rightarrow 4} h(x) = 2.5$



(4, 2.5)
removable
discontinuity

#5 (a) 1 (b) 1

(c) 1 (d) dne

(e) 1 (f) -1

(g) dne (h) 1

(i) 2 (j) 2

(k) 2 (l) 3

(m) 3 (n) \emptyset

(o) dne (p) dne

HW Set One

3, 7, 9, 11

Set Two

1, 3