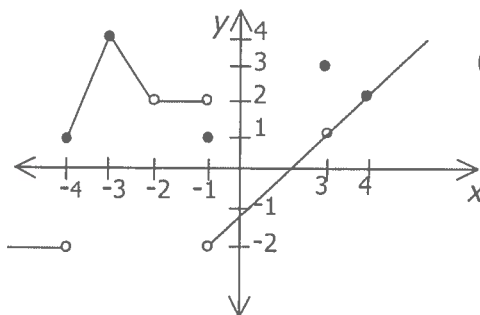


Classwork I 2015, 1, 27

Name: Sol

PS ID: _____



$(-4, -2) \cup (-2, -1) \cup$
 $(-1, 3) \cup (3, \infty) \cup (-\infty, -4)$

Where is the function continuous?

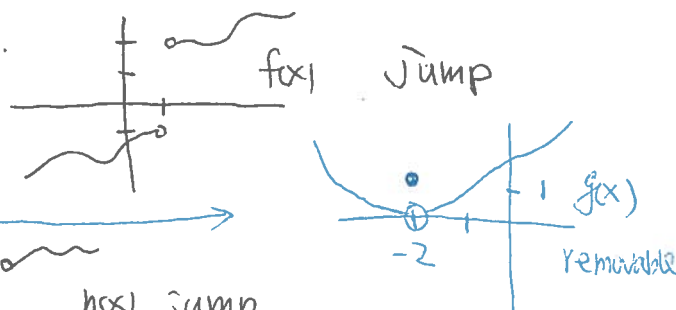
Input $x = a$	Output $f(a)$	Left-hand limit $\lim_{x \rightarrow a^-} f(x)$	Right-hand limit $\lim_{x \rightarrow a^+} f(x)$	Limit $\lim_{x \rightarrow a} f(x)$
-4	1	-2	1	DNE
-3	4	4	4	4
-2	DNE	2	2	2
-1	1	2	-2	DNE
3	3	1	1	1
4	2	2	2	2

Limit table for the function f .

Sketch the graph of a function satisfying the stated requirements.

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

$f(1)$ is undefined



2. $\lim_{x \rightarrow -2^-} g(x) = 0$ $\lim_{x \rightarrow -2^+} g(x) = 0$

$g(-2) = 1$

3. $\lim_{x \rightarrow 2^-} h(x) = -2$ $\lim_{x \rightarrow 2^+} h(x) = 2$

$h(2) = 0$

4. $\lim_{x \rightarrow 0^-} i(x) = -1$ $\lim_{x \rightarrow 0^+} i(x) = -2$

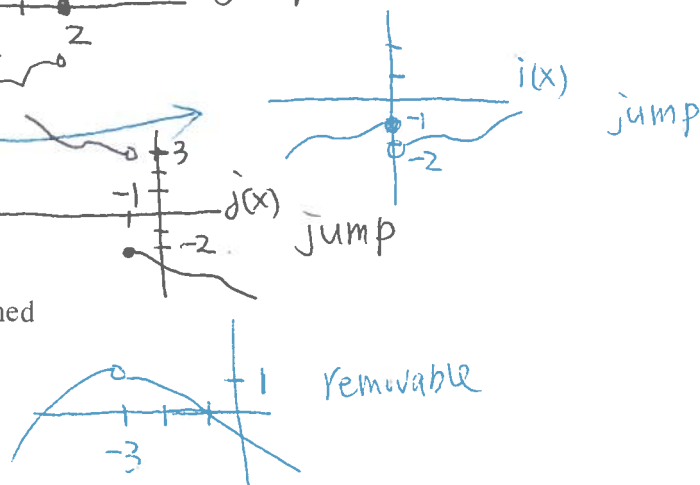
$i(0) = -1$

5. $\lim_{x \rightarrow -1^-} j(x) = 3$ $\lim_{x \rightarrow -1^+} j(x) = -2$

$j(-1) = -2$

6. $\lim_{x \rightarrow -3^-} k(x) = 1$ $\lim_{x \rightarrow -3^+} k(x) = 1$

$k(-3)$ is undefined



limits

Continuity

discontinuity

Let $f(x)$ be a ^{real} function. Then we say

(1) the limit of $f(x)$ exists at $x=a$

$$\text{if } \lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x).$$

and

(2) $f(x)$ is continuous at $x=a$

$$\text{if } \lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x) = f(a).$$

Otherwise, we say $f(x)$ is discontinuous at $x=a$.

" $x \rightarrow a^+$ " means " $x > a$ & x is pretty close to a "

" $x \rightarrow a^-$ " means " $x < a$ & x is pretty close to a "