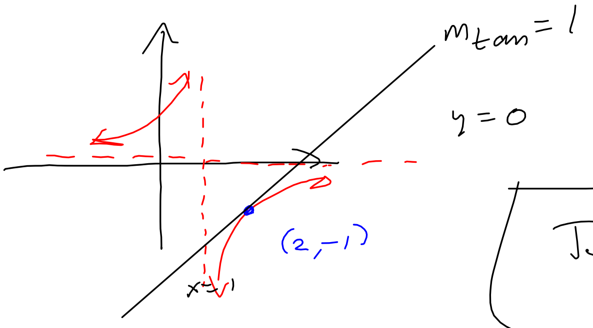
$$f(x) = \frac{1}{1-x} = -\frac{1}{x-1}$$



what we did was check the slope @ $x=2$, numerically.

Test 1 2sday Tuesday

§1.8

$$f(x) = \frac{x^2-x}{x-1} = \frac{x(x-1)}{x-1} = x, \quad x \neq 1$$

where's $f(x)$ continuous?

Everywhere, except where it isn't!

So $x=1$ is only problem:

$\mathcal{D} = \mathbb{R} \setminus \{1\}$

$\lim_{x \to 1} f(x)$?

$$f(x) = \frac{x^2-x}{x-1} = \frac{x(x-1)}{x-1} = \underset{(x \neq 1)}{x} \xrightarrow{x \to 1} \boxed{1 = \lim_{x \to 1} f(x)}$$

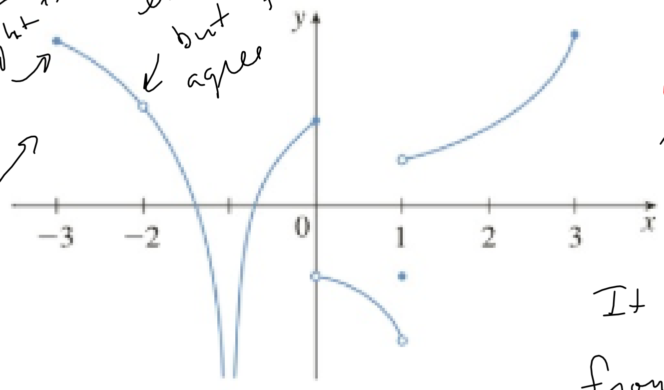
Limits are 2-sided.

4. From the graph of g, state the intervals on which g is continuous.

$\lim_{x \to c} f(x) = f(c)$

cts from right

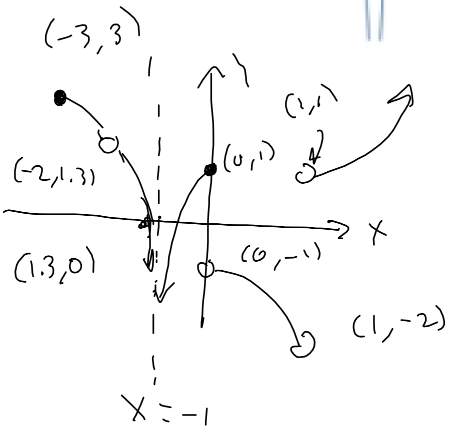
limit exists but f(-2) doesn't agree



$(-3,-2) \cup (-2,-1) \dots$

limits are two-sided.

It is continuous from the right at $x = -3$

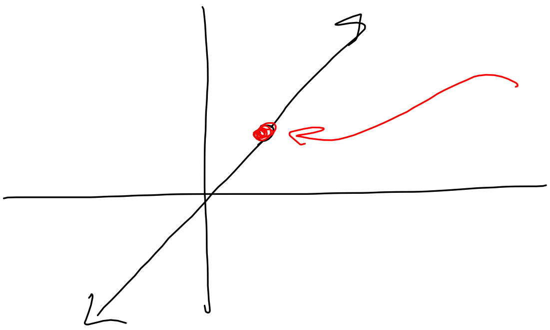


$(-3,-2) \cup (-2,-1) \cup (-1,0) \cup (0,1)$
$\cup (1,\infty)$

$$f(x) = \begin{cases} \frac{x^2 - x}{x-1} & \text{if } x \neq 1 \\ 1 & \text{if } x = 1 \end{cases}$$ is a complicated way to say $f(x) = x$!

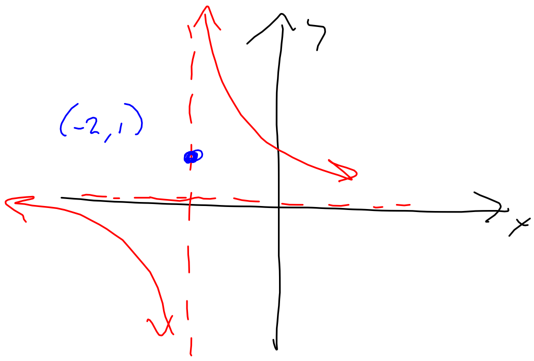
$f(x) = x$ if $x \neq 1$, basically.

But if we <u>Define</u> $f(1) = 1$, that patches the hole



$f(1) = 1$ fills the hole!

$$f(x) = \begin{cases} \frac{1}{x+2} & \text{if } x \neq -2 \\ 1 & \text{if } x = -2 \end{cases}$$



Not cont^{s} at $x = -2$

b/c $\lim_{x \to -2} f(x) \nexists$.

#24 Removable Discontinuity when there's just a hole.

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$f(x) = \frac{x^3 - 8}{x^2 - 4}$

No real zeros of the quadratic factor for these.

$= \frac{\cancel{(x-2)}(x^2 + 2x + 4)}{\cancel{(x-2)}(x+2)} = \frac{x^2 + 2x + 4}{x+2} \xrightarrow{x \to 2} \frac{4+4+4}{4} = 3$

Define $f(2) = 3$.

Now, cont's everywhere!