Math 191 Website
www.leahhoward.com

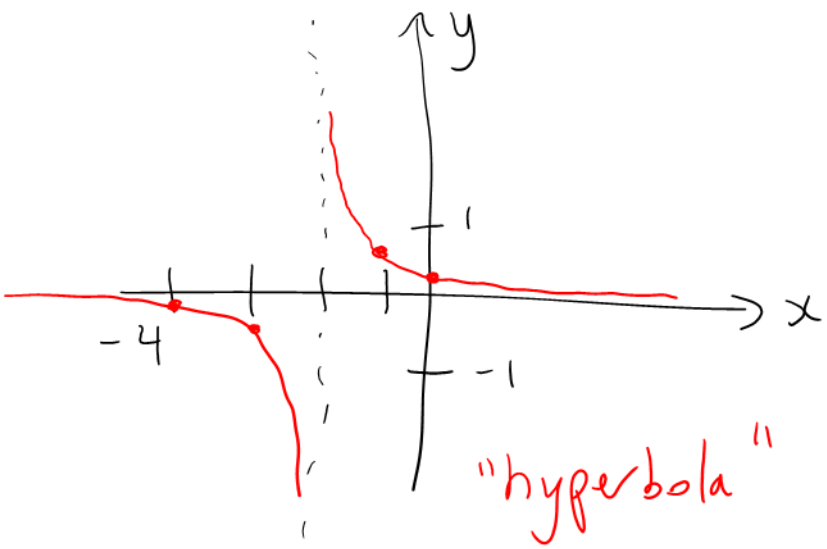
Big Ideas in Calculus:
1) Rates of change (velocity, acceleration)
2) Areas and Volumes

23.1 Limits

A function is <u>continuous</u> at an x-value if there is no hole or jump there.

<u>Ex</u>: $f(x) = \frac{1}{2x+4}$
Where is $f(x)$ continuous?

x	$f(x)$
-4	$-\frac{1}{4}$
-3	$-\frac{1}{2}$
-2	undefined
-1	$\frac{1}{2}$
0	$\frac{1}{4}$



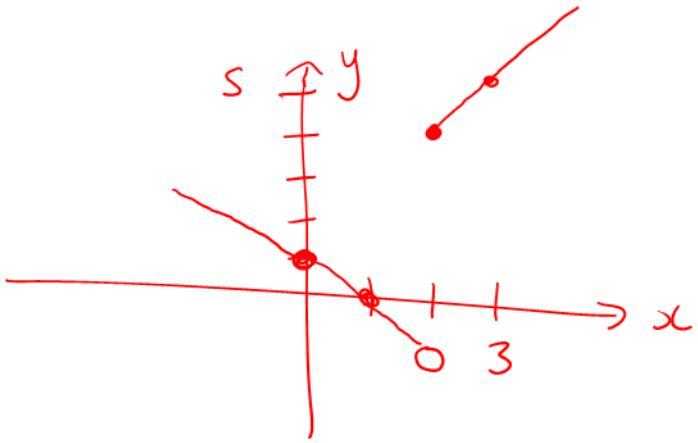
$f(x)$ is continuous for all x-values, except $x=-2$.

$f(x)$ is continuous for $x \neq -2$

Ex: $f(x) = \begin{cases} x+2 & , x \geq 2 \\ 1-x & , x < 2 \end{cases}$

Where is $f(x)$ continuous?

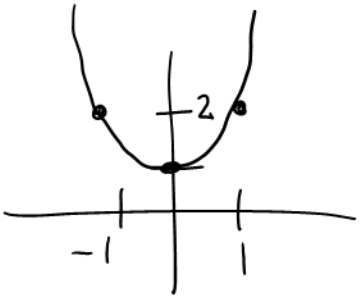
x	$f(x)$	
$x<2$: 0	1	$f(x)=1-x$
$x<2$: 1	0	$f(x)=1-x$
$x\geq 2$: 2	4	$f(x)=x+2$
$x\geq 2$: 3	5	$f(x)=x+2$



$f(x)$ is continuous for $x \neq 2$

Ex: $f(x) = x^2+1$

where is $f(x)$ continuous?



$f(x)$ is continuous for all x

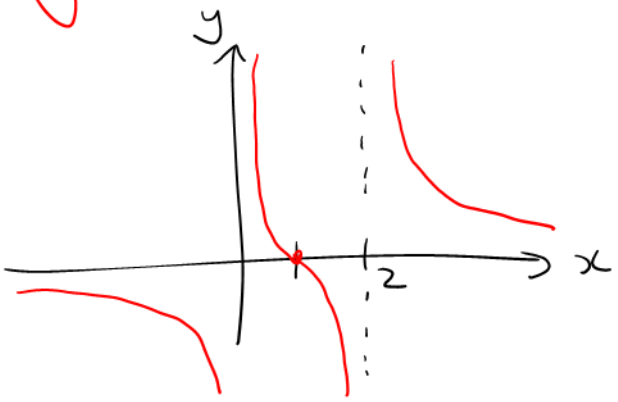
Ex: $f(x) = \frac{x-1}{x^2-2x}$

Where is $f(x)$ continuous?

Quick Way to Graph:

Google "Wolfram Alpha"

"Graph $y = (x-1)/(x\wedge 2 - 2x)$"



$f(x)$ is continuous for $x \neq 0, 2$