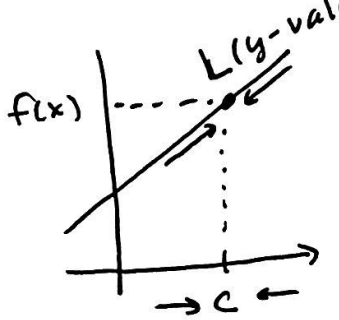
Assignment
P. 826 (6-24e
25-32 all)

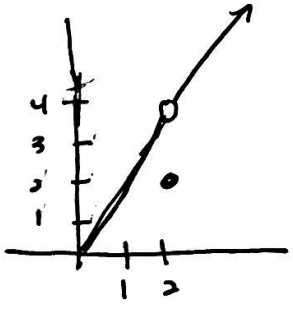
12.1 Intro to Limits

Definition of a Limit

If $f(x)$ becomes arbitrarily close to a unique number L as x approaches c from either side, then the limit of $f(x)$ as x approaches c is L.



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



$\lim_{x \to 2^-} f(x) = ?$ **4**

means what is the y-value as we get close to 2 (x-value) from the left side

$\lim_{x \to 2^+} f(x) = ?$ **4**

means what is the y-value as we get close to 2 (x-value) from the right side

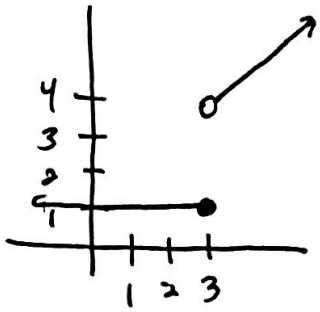
$f(2) = ?$ **2**

This is the actual point at $x = 2$ (Not a limit)

(2, 2) is the closed circle

$\lim_{x \to 2} f(x) = ?$ **4**

means what is the y-value as we get close to 2 (x-value) from both sides. It has to be the same on left and right or does not exist



$\lim_{x \to 3^-} f(x) = 1$

$\lim_{x \to 3^+} f(x) = 4$

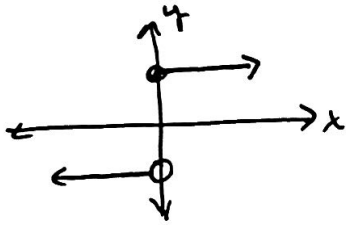
$\lim_{x \to 3} f(x) = DNE$ (Does Not Exist)

Because the left is 1 and the right is 4. They have to be the same.

$f(3) = 1$

Closed at (3, 1)

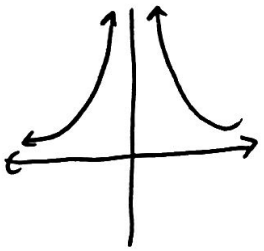
When Limits fail to exist



No limit at $x = 0$

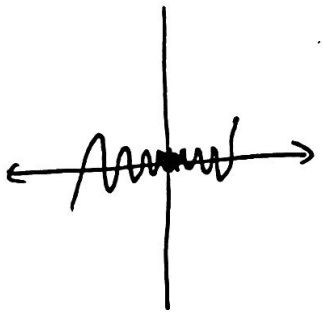
jump discontinuity

(Left and Right limits are Not the same)



$\lim_{x \to 0^-} f(x) = \infty$ $\lim_{x \to 0^+} f(x) = \infty$

even though the left and right are the same it DNE because it is an unbounded behavior



$\lim_{x \to 0} f(x) = DNE$

because it is oscillating back and forth on y-values

#5 $\lim_{x \to 1} (7x+3)$

X	.9	.99	.999	1	1.001	1.01	1.1
f(x)	9.3	9.93	9.993	?	10.007	10.07	10.7

— just plug x-value in equation and use Calculator to get answers

→ $(7(.9)+3) = 9.3$

— When done with the chart guess what value the (?) is by seeing what the values for f(x) are getting closer to.

9.993 ? 10.007

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#12 Make your own chart

$\lim_{x \to -2} \frac{x+2}{x^2+5x+6}$

x	-2.1	-2.01	-2.001	-2	-1.999	-1.99	-1.9
f(x)	1.1111	1.0101	1.0010	?	.9990	.9901	.9091

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use the picture to set the limit and if DNE the explain why.