Week 3 Thursday

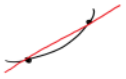
January 23, 2019 10:34 AM

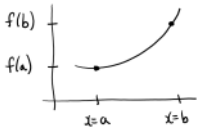
Quiz Tues 3.3

Math Lab TEC 142 Mon-Thurs 11-4

3.3 Cont'd

Definition: Average rate of change of f from $x=a$ to $x=b$ is the slope of the line:





Average rate of change $= \frac{\Delta y}{\Delta x} = \frac{f(b)-f(a)}{b-a}$ (A)

Ex: Find average rate of change of $f(x) = 5x^2+2$ from $x=2$ to $x=4$

$$\frac{f(b)-f(a)}{b-a} = \frac{f(4)-f(2)}{4-2} = \frac{82-22}{2} = \frac{60}{2} = 30$$

Comment about Units:

Say y: °C

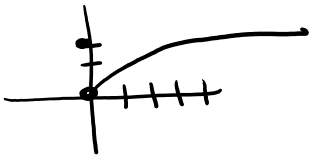
x: minutes

average rate of change: °C/min

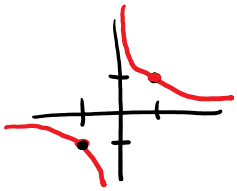
3.4 ~~Library of Functions~~ Piecewise-Defined Functions

A function is continuous if it can be traced without lifting your pencil (no holes or jumps)

Ex: $y=\sqrt{x}$ is Continuous



Ex: $y = \frac{1}{x}$ is not continuous



Piecewise-Defined Functions

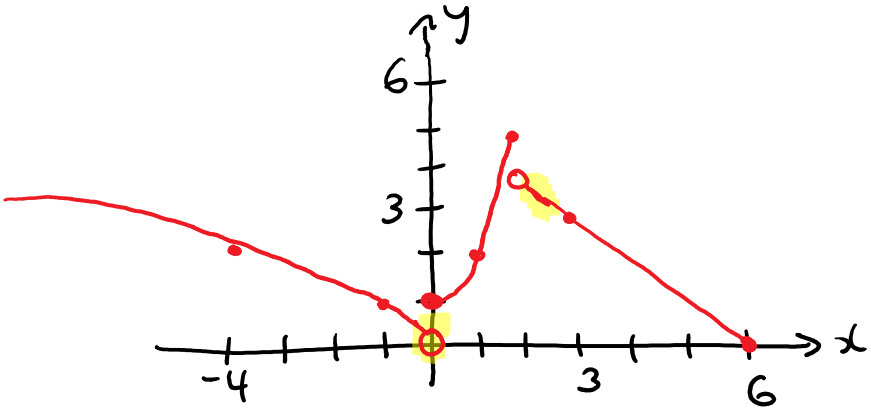
Ex: $f(x) = \begin{cases} \sqrt{-x}, & x < 0 \\ x^2+1, & 0 \le x \le 2 \\ 6-x, & 2 < x \le 6 \end{cases}$

a) Table of values

	x	y
$x<0$, $y=\sqrt{-x}$	-4	$\sqrt{-(-4)} = 2$
	-1	$\sqrt{-(-1)} = 1$
$0 \le x \le 2$, $y = x^2+1$	0	1
	1	2
	2	5
	2	4
$2 < x \le 6$, $y = 6-x$	3	3
	6	0

open circle

b) Graph it



c) Is $f(x)$ continuous?

No

d) Domain of $f(x)$?

(set of x-values)

$-\infty < x \leq 6$

e) Range of $f(x)$?

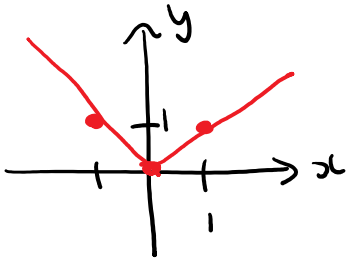
(set of y-values)

$y \geq 0$ ✓

$0 \leq y < \infty$ ✓

Ex: Graph $y = |x|$

x	y
-1	$\lvert -1 \rvert = 1$
0	$\lvert 0 \rvert = 0$
1	$\lvert 1 \rvert = 1$



Note: $y = |x|$ is a piecewise-defined function (and continuous!)

$$|x| = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$$