Date: 8/21/18

Chp: Chp 1:2 → Functions & Graphs

Obj: Remember....

Domain & Range
Interpret Graphs
Even & odd Functions
Piece-wise Functions
Absolute Value Functions
Composite Functions

* Independent variables = x-axis
  = constant

* dependent variables = do change
  = depend on independent
  = y-axis

* Domain = x values (ind. variable)

* Range = y values (dep. variable)

* Function = 1-1
  f(x) = one x value for 1 y value

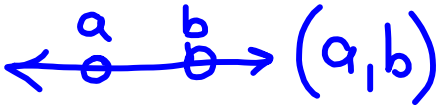
* Natural Domain = When the domain is not stated directly or restricted by its context, its the largest set of x-values for which there are real y-values.

* Boundary Pts = Endpts of an interval

* Interior Pts = Pts between the boundary pts.

* Closed Interval = Contains the boundary pts. [,] .

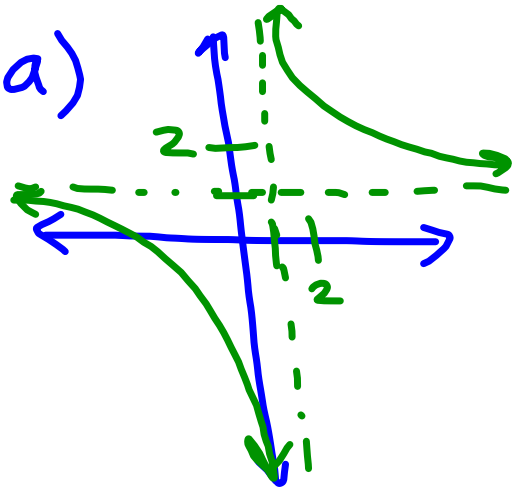
* Open Interval = Does not contain boundary pts. (,) .



Exs

Ex 1 = Identify D & R.

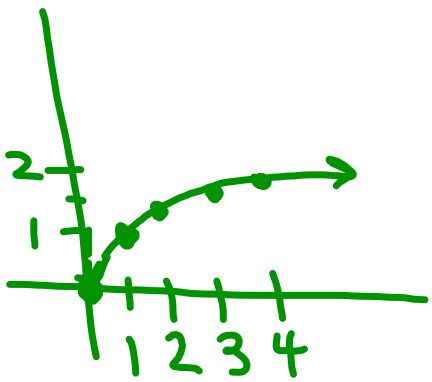
a)



$D = (-\infty, 1) \cup (1, \infty)$

$R = (-\infty, 1) \cup (1, \infty)$

b)



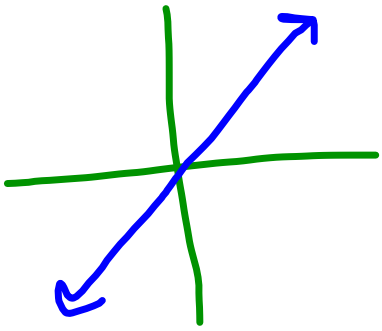
$D = [0, \infty)$

$R = [0, \infty)$

1) Linear

$y = mx + b$

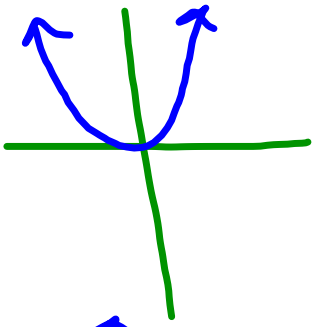
$y = x$



2) Quadratic

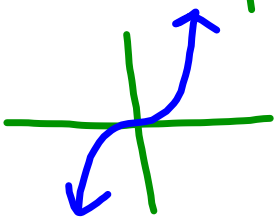
$y = ax^2 + bx + c$

$y = x^2$



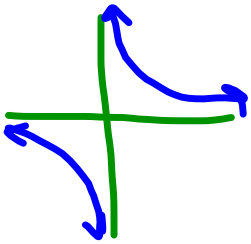
3) Cubic

$y = x^3$



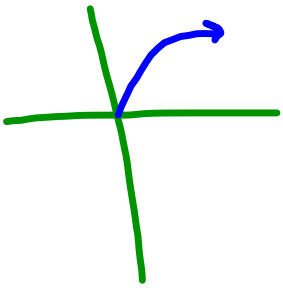
4) Rational

$y = \frac{1}{x}$



5) Radical

$y = \sqrt{x}$



Even & Odd Functions & Their Symmetries

1) Even
   - → $f(-x) = f(x)$
   - → symmetric about y-axis
   - → If pt (x, y) lies on graph, pt $(-x, y)$ must lie on the graph.

2) Odd
   - → $f(-x) = -f(x)$
   - → symmetric about origin
   - → If pt (x, y) lies on the graph, pt $(-x, -y)$ must lie on the graph.

Ex. 2

a) $f(x) = x^2$ $f(-x) = (-x)^2 = x^2$ (E)

b) $f(x) = x^2 + 1$ (Even)

c) $f(x) = x$ $f(-x) = -(x) = -x$ (O)

d) $f(x) = x + 1$ $f(-x) = -(x) + 1 = -x + 1$ (Neither)

* Piece-Wise Functions = Graphs w/ different formulas for different parts of the domain.

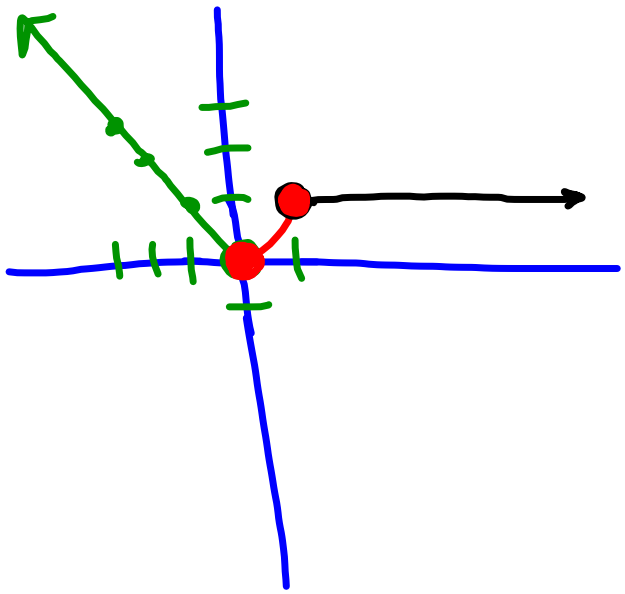
Ex 3 - Graph the piecewise functions.

$$f(x)=\begin{cases} -x & x<0 \\ x^2 & 0\le x\le 1 \\ 1 & x>1 \end{cases}$$

$y=-x$

$y=x^2$

$y=1$



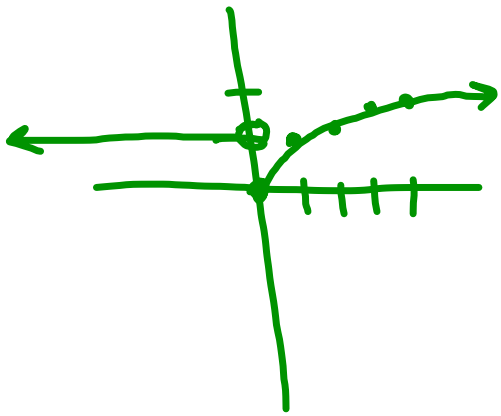
$-\frac{b}{2a}$

x	y
2	
1	
0	0
-1	
-2	

Ex. 4

$$f(x) = \begin{cases} 1 & x < 0 \\ \sqrt{x} & x \geq 0 \end{cases}$$

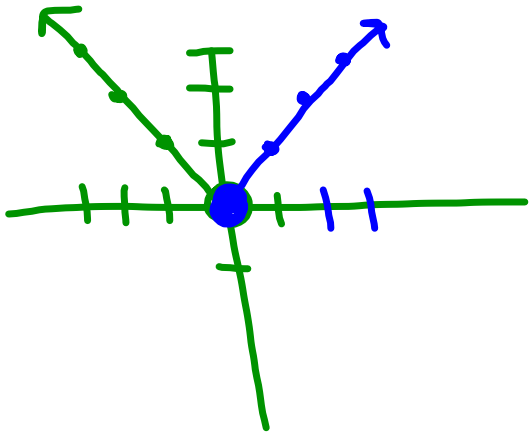
y



*Absolute Value Functions= $y=|x|$

$$f(x)=\begin{cases} -x & x<0 \\ x & x\geq 0 \end{cases}$$

$y=-x+0$



$D=(-\infty,\infty)$

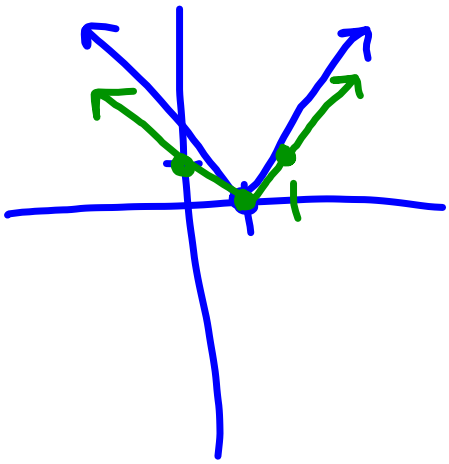
$R=[0,\infty)$

Ex. 5

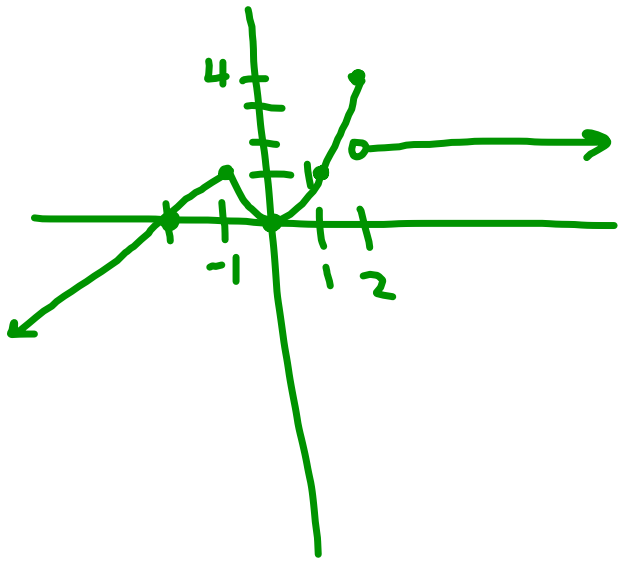
h

$f(x) = -|x-1|+2$

x	y
0	1
1	0
2	1



Ex. 6



$$f(x)=\begin{cases}2 & x>2\\ x^2 & -1\le x\le 2\\ x+2 & x\le -1\end{cases}$$

Composite Functions

$(f \circ g)(x)$ → plug $g(x)$ into $f(x)$

$(g \circ f)(x)$ → plug $f(x)$ into $g(x)$

Ex. 7

$f(x) = x - 7$

$g(x) = x^2 - 1$

$(f \circ g)(x) = x^2 - 1 - 7$

$= x^2 - 8$

$(g \circ f)(x) = (x-7)^2 - 1$

$x^2 - 14x + 49 - 1$

$x^2 - 14x + 48$

$(f \circ g)(2) = x^2 - 8$

$2^2 - 8$

$4 - 8 = -4$

$(x-7)(x-7)$

$-7x + -7x$

$-7x(2)$

$(x-7)^2$

$x^2 - 14x + 49$

Homework (Part 2):

p. 19 (#31, 33, 37-40, 42, 45, 51)