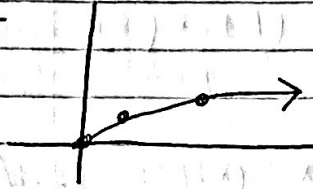


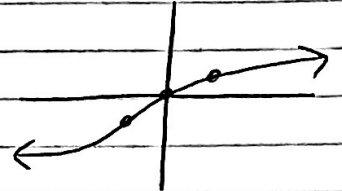
### 3.4 Library of Functions; Piecewise

HW # 7-49 odd, 55

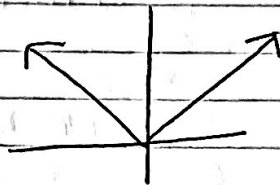
square root  
 $f(x) = \sqrt{x}$



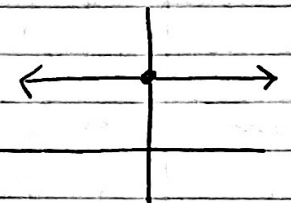
cuberoot  
 $f(x) = \sqrt[3]{x}$



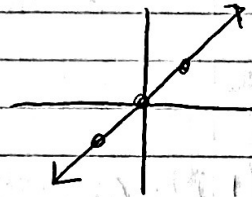
Absolute value  
 $f(x) = |x|$



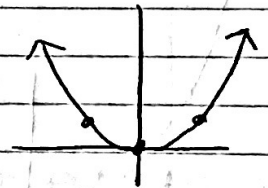
constant  
 $f(x) = b$



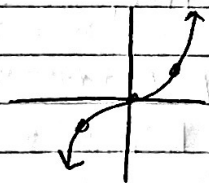
Identity  
 $f(x) = x$



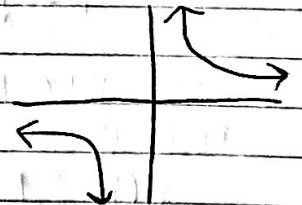
square  
 $f(x) = x^2$



cube  
 $f(x) = x^3$



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



### Greatest Integer Function

$$f(x) = \text{int}(x) \text{ or } f(x) = [x]$$

(greatest integer less than or equal to x)

ex.)  $\text{int}(1) = 1$

$\text{int}(-\frac{3}{4}) = -1$

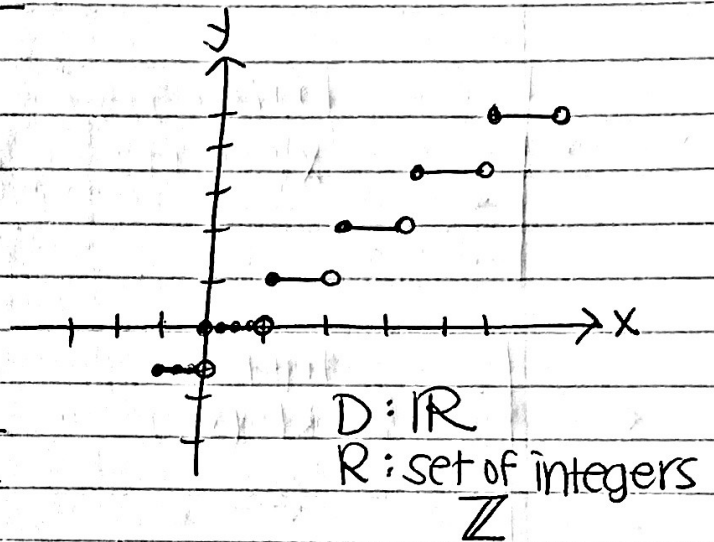
$\text{int}(2.5) = 2$

$\text{int}(\frac{1}{2}) = 0$

$\text{int}(\pi) = 3$

## Graphing Integer function

x	$y = \text{int}(x)$	(x, y)
-1	-1	(-1, -1)
-1/2	-1	(-1/2, -1)
-1/4	-1	(-1/4, -1)
0	0	(0, 0)
1/4	0	(1/4, 0)
1/2	0	(1/2, 0)
3/4	0	(3/4, 0)



→ aka step function

## Piecewise-defined function

\*when a function is defined by different equations on different parts of its domain it's called a piecewise-defined function.

$$\text{ex. } f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

## Analyzing a Piecewise

$$\text{ex. 3) } f(x) = \begin{cases} -2x+1 & \text{if } -3 \leq x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$$

a) Find  $f(-2) = -2(-2)+1 = +4+1 = \boxed{5}$

Find  $f(1) = \boxed{2}$

find  $f(2) = \boxed{4}$

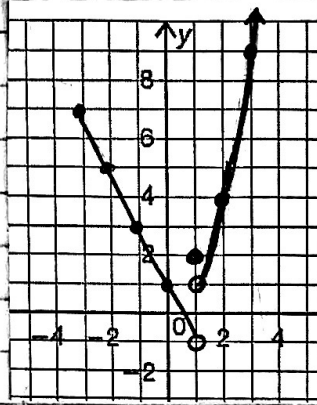
b) Domain?  $\{x \mid x \geq -3\}$  or  $[-3, +\infty)$

c) intercepts? y-int:  $x=0$  so  $-2(0)+1=1$   $\boxed{(0,1)}$

x-int:  $y=0$  so  $0 = -2x+1$   $0=2$   $0=x^2$   
 $\boxed{(\frac{1}{2}, 0)}$  NS  $\boxed{(0,0)}$

$$f(x) = \begin{cases} -2x+1 & \text{if } -3 \leq x < 1 \\ 2 & \text{if } x=1 \\ x^2 & \text{if } x > 1 \end{cases}$$

d) graph?



e) Range?

$$\{y \mid y > -1\} \text{ or } (-1, +\infty)$$

f) continuous on domain?

not continuous because there is a "jump" at  $x=1$

ex. 4) LOOK at textbook

$$0 \leq x \leq 800 \text{ kWh} \rightarrow \$6.50 + 9.971¢ \text{ per kWh}$$

$$x > 800 \text{ kWh} \rightarrow (\$6.50 + 9.971¢) + (8.791¢ \text{ per kWh over } 800)$$

$$C(x) = \begin{cases} 6.50 + 0.09971x & \text{if } 0 \leq x \leq 800 \\ 14.50 + 0.08971x & \text{if } x > 800 \end{cases}$$

$$C(x) = .09971(800) + 6.50 + 0.08971(x-800)$$