Unit 2 Continued

p 2.23

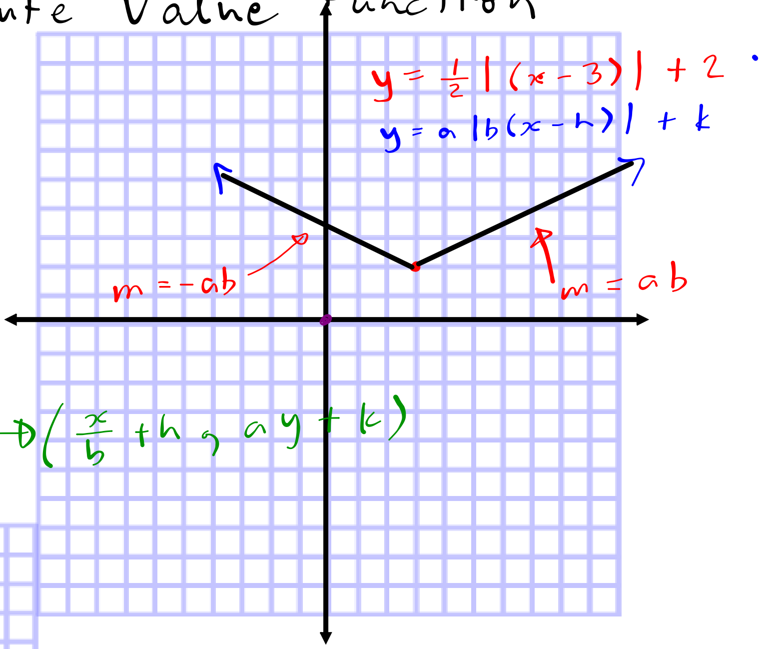
Absolute Value Function

$y = a|b(x-h)|+k$

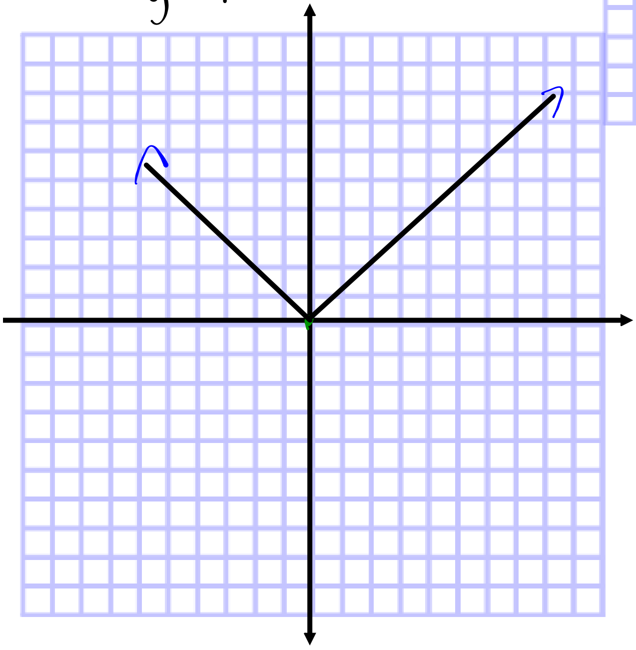
$V(h,k)$

initially: $a = 1$ $h = 0$
$b = 1$ $k = 0$

$(x,y) \longrightarrow \left(\frac{x}{b}+h, ay+k\right)$



$y = |x|$



graph

$f(x) = 2|-x+3| - 4$

$y = a|b(x-h)| + k$

step i. put equation in base form and identify parameters.

$f(x) = 2|\underset{-1}{-x} + \underset{-1}{3}| - 4$

$f(x) = 2|-1(x-3)| - 4$

$y = a|b(x-h)| + k$

$a = 2$ $h = 3$

$b = -1$ $k = -4$

stop ii: make TOV

x	y
$h-2$	..
$h-1$	.
h	k
$h+1$	.
$h+2$	..

	x	y
I	1	0
E	2	-2
	3	-4
J	4	-2
Ja	5	0

$f(1) = 2|-1(1-3)| - 4$

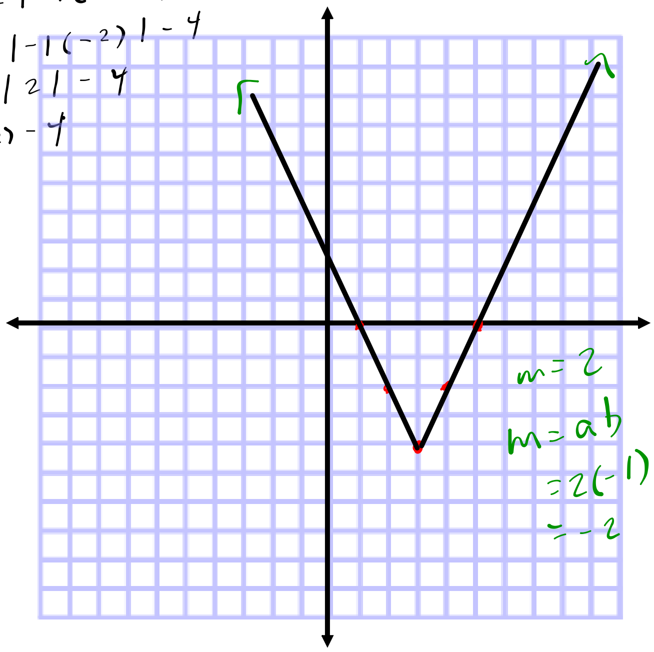
$f(1) = 2|-1(-2)| - 4$

$f(1) = 2|2| - 4$

$f(1) = 2(2) - 4$

$f(1) = 0$

$y = 2|-1(x-3)| - 4$



$m = 2$

$m = ab$

$= 2(-1)$

$= -2$

step iii Plot point & confirm w/ parameter

graph

$$f(x) = \{ (x,y) \in \mathbb{R} \times]-6,4] \mid y = 5|-x-3| - 6 \}$$

Find Domain
& Range!

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Greatest Integer Function [ ]

(Step Function)

$y = a[b(x-h)]+k$

greatest integer

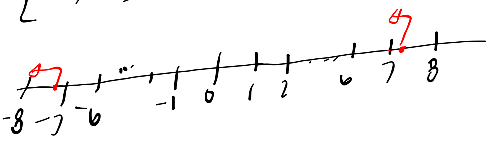
$[7.3] = 7$

↳ find the greatest integer (whole #)

- round down

$[7.9] = 7$

$[-7.2] = -8$



Initially

a = 1 h = 0

b = 1 k = 0

$y = [x]$

(h, k)

(0, 0)

$L = \frac{1}{|b|}$

L = 1

m = ab

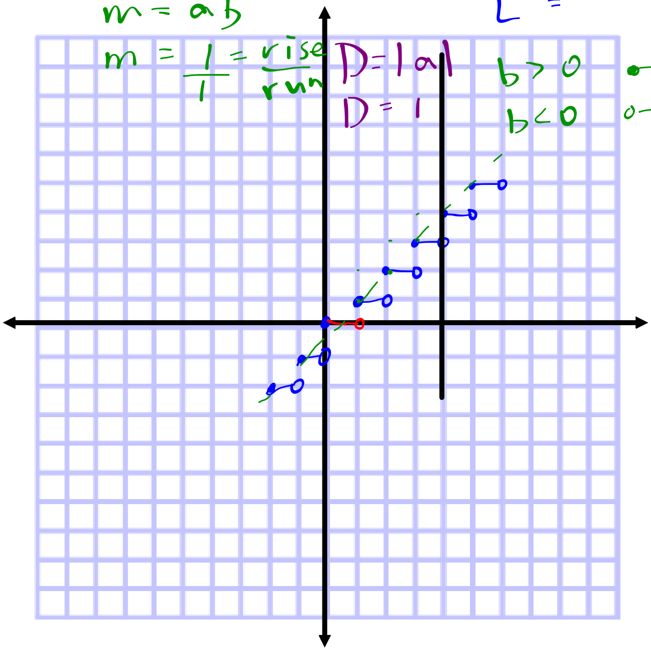
$m = \frac{1}{1} = \frac{\text{rise}}{\text{run}}$

D = |a|

D = 1

b > 0 ●—○

b < 0 ○—●



graph

$f(x) = 3\left[\frac{1}{4}(x+3)\right] - 1$

$y = a[b(x-h)] + k$

step i put equation in base form

step ii identify parameters and all corresponding info about steps.

$a = 3$ $h = -3$

$b = \frac{1}{4}$ $k = -1$

$L = \frac{1}{|b|}$

$L = \frac{1}{|\frac{1}{4}|}$

$L = \frac{1}{1/4}$

$L = \frac{1}{1} \times \frac{4}{1}$

$L = 4$

$b > 0$ ●—○

$m = ab$

$m = \frac{3}{1}(\frac{1}{4})$

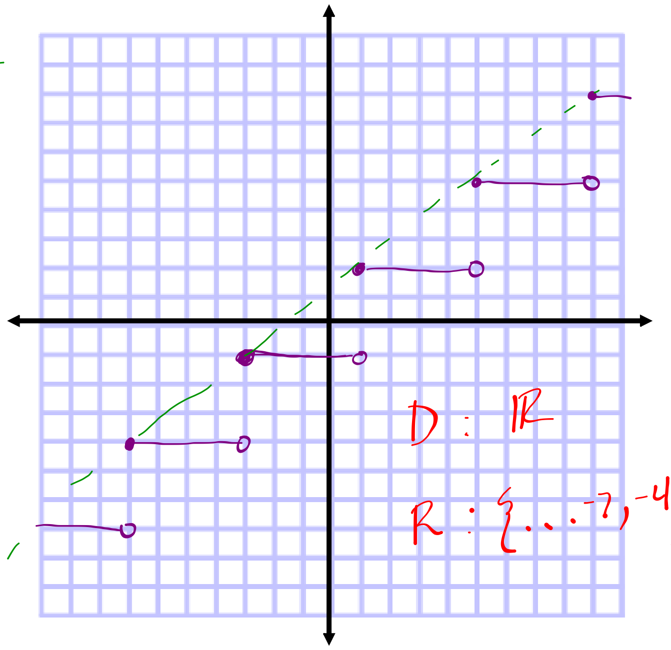
$m = \frac{3}{4}$

$D = |a|$

$D = 3$

s. P.
solid point
aka starting point
$(-3, -1)$

step iii. Plot starting point and put info to use



D : $\mathbb{R}$

R : $\{\ldots -7, -4, -1, 2, 5, \ldots\}$

$$f(x) = 2\left[-\frac{1}{3}(x+2)\right]$$

Square Root Function

$f(x) = a\sqrt{\underline{b(x-h)}} + k$

$V(h,k)$

Domain

$\underline{b(x-h)} \geq 0$

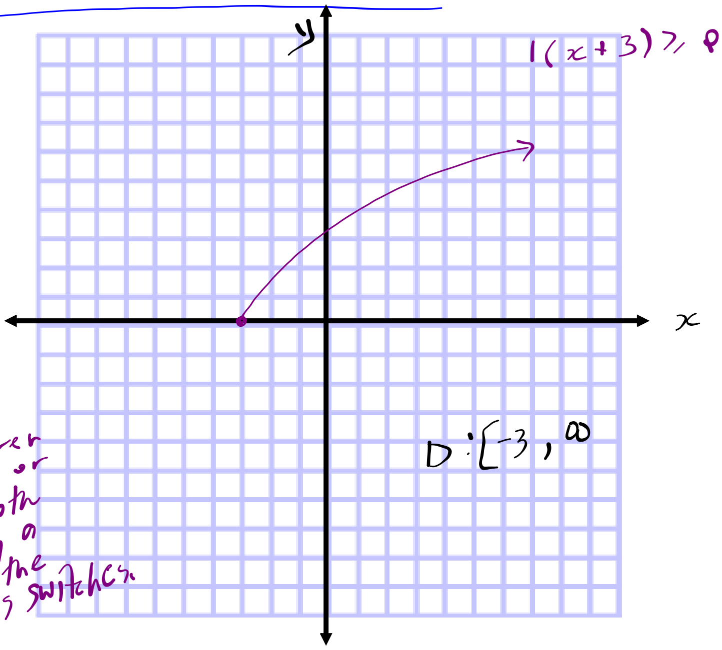
$y = \sqrt{\underline{x+3}}$

$x+3 \overset{-3}{\geq} 0 - 3$

$x \geq -3$

whenever you times or divide both sides by a negative, the signs switches.

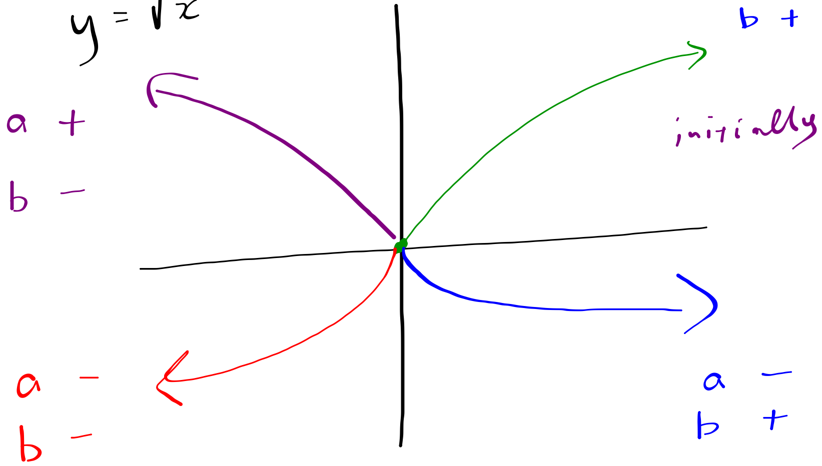
$1(x+3) \geq 0$



D: [-3, ∞

initially

$y = \sqrt{x}$



graph

$f(x) = -2\sqrt{-x - 1} + 4$

$\frac{-x}{-1}$ $\frac{-1}{-1}$

$y = a\sqrt{b(x-h)} + k$

step i put equation in base form and identify parameters

$y = -2\sqrt{-1(x+1)} + 4$

$a = -2$ $h = -1$ $V(-1,4)$

$b = -1$ $k = 4$

step ii construct TOV with x's the respect the Domain

x	y
h	k

D $b(x-h) \geq 0$

$-x - 1 \overset{+1}{\geq} 0 \, {+1}$ solve!

$-x \geq 1$

$\frac{-x}{-1} \quad \frac{1}{-1}$

$x \leq -1$

* whenever you times or divide both sides by a negative, the signs switches.

x	y
-1	4
-2	2
-3	1.17

find $f(-2) = -2\sqrt{-1(-2+1)} + 4$

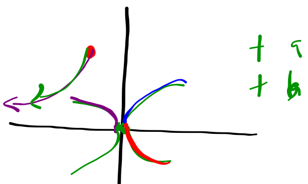
$f(-2) = 2$

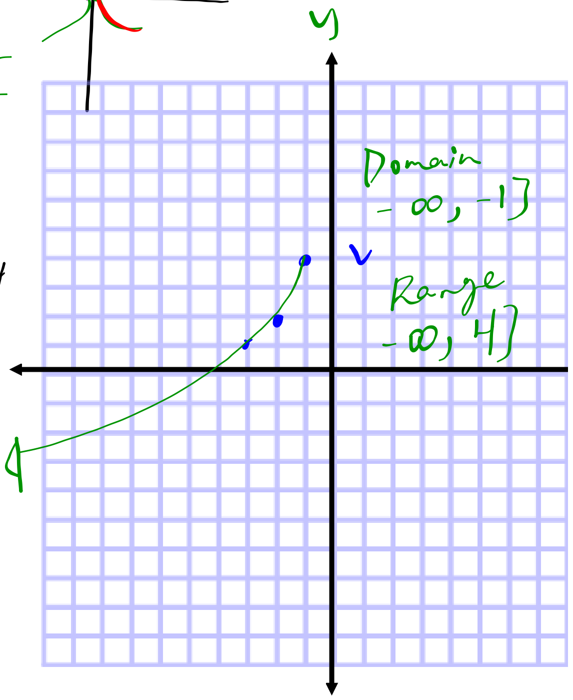
$f(-3) = -2\sqrt{-1(-3+1)} + 4$

step iii plot points $f(-3) = -2\cancel{\times}\sqrt{2} + 4$

$f(-3) = -2(1.41) + 4$

check the sketch!





Domain
$-\infty, -1]$

Range
$-\infty, 4]$

p 2.77 f)

graph

$g(x) = \sqrt{-2x} - 1$

Rational Function

$f(x) = \frac{a}{b(x-h)} + k$

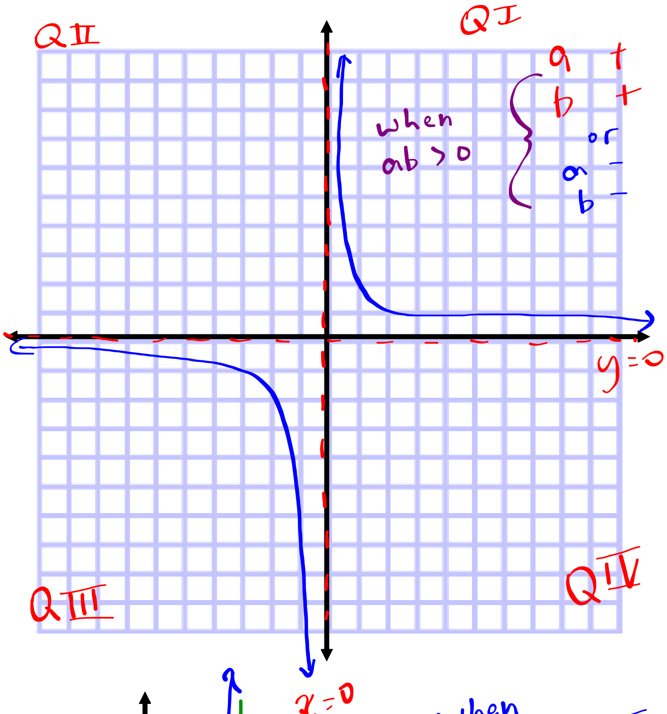
$x = h$ } asymptotes
$y = k$

invisible line the function always approaches but never touches.

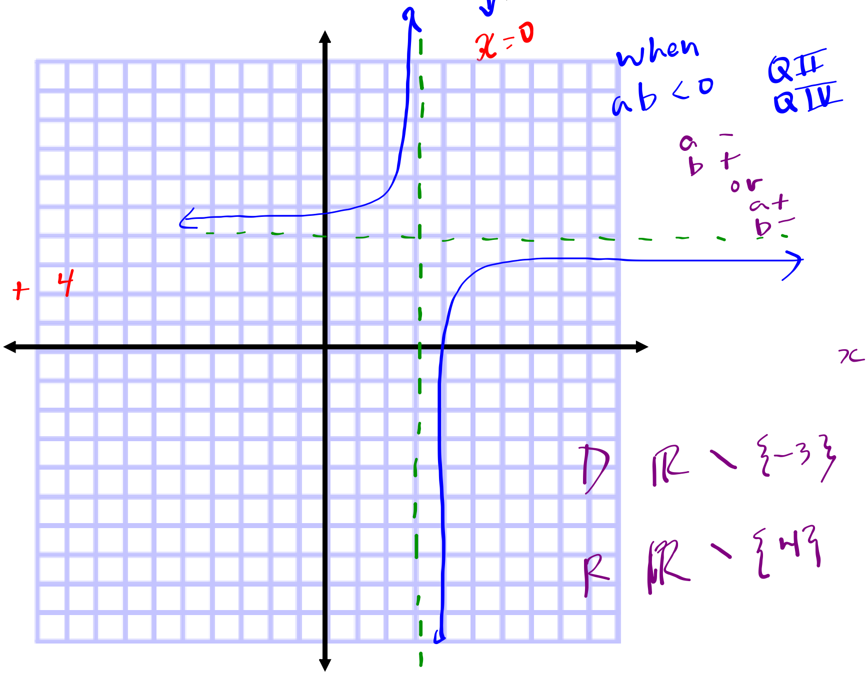
initially $a = 1$ $h = 0$
$b = 1$ $k = 0$

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

$x = 0$ } asymptotes
$y = 0$



when $ab > 0$ { a + b + or a − b −



when $ab < 0$ QII QIV

a − b + or a + b −

$y = \frac{-1}{x-3} + 4$

$x = 3$
$y = 4$

D $\mathbb{R} \setminus \{-3\}$

R $\mathbb{R} \setminus \{4\}$

graph

$f(x) = \frac{1}{-(x-2)} + 3$

$y = \frac{a}{b(x-h)} + k$

a = 1 h = 2

b = -1 k = 3

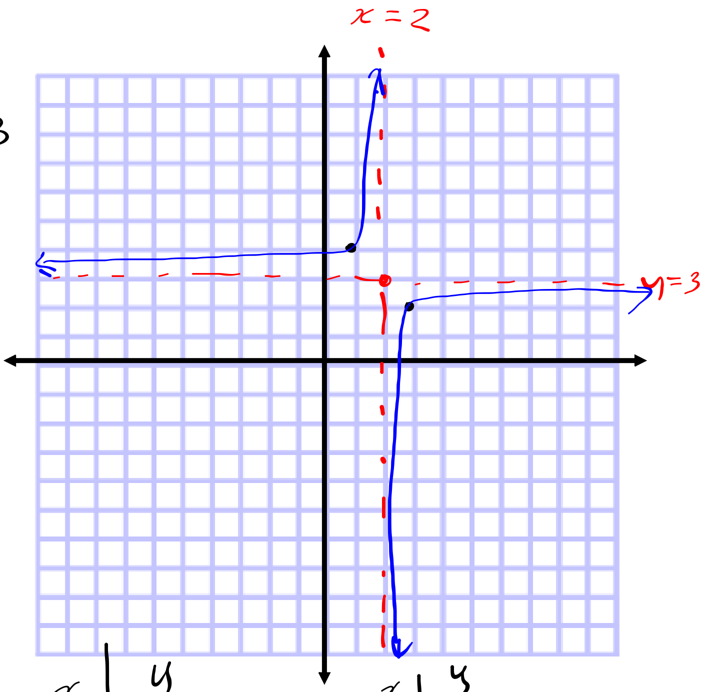
x = 2

y = 3

plot (h,k) and draw a vertical & horizontal line

a·b
= 1(-1)
= -1 ← less than zero so QII & QIV

$y = \frac{1}{-1(x-2)} + 3$



x	y
h+1	
h	error
h-1	·

x	y
1	4
2	error
3	2

$f(3) = \frac{1}{-1(3-2)} + 3$

$f(3) = -1 + 3$

$f(3) = 2$

$f(1) = \frac{1}{-1(1-2)} + 3$

$f(1) = 1 + 3$

graph

$y = \frac{-1}{x+2} - 4$