Section 10
Jan 28

§1.10 Lines

$Ax+Bx+C=0$ general

$y=mx+b$ slope intercept form

$y-y_1=m(x-x_1)$ point slope

$$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2-y_1}{x_2-x_1} = \frac{\Delta \text{output}}{\Delta \text{input}}$$

Special Cases:

$m=0$ Horizontal line $y=$ Constant

~~$m=\infty$~~ Vertical line $x=$ constant (only lines which aren't functions)

$m>0 \Rightarrow$ increasing line. /

$m<0 \Rightarrow$ decreasing line \

parallel / perpendicular

Given

Two lines $L_1: y=m_1x+b_1$

$L_2: y=m_2x+b_2$

parallel $\parallel$: $m_1=m_2$

perpendicular $\perp$: $m_1=-\frac{1}{m_2}$

Practice:

1.) Find the equation of the line

(a) goes thru A $(-1,1)$, B $(3,9)$

$m = \frac{9-1}{3-(-1)} = \frac{8}{4} = 2$

$y - 1 = 2(x+1)$

$y = 2(x+1) + 1$

$\boxed{y = 2x + 3}$

(b) perpendicularly bisects $\underline{AB}$ (as above)

$m = -\frac{1}{m_1}$

$m = -\frac{1}{2}$

point? midpt: (avg of x, avg of y)

$(1,5)$

$y - 5 = -1/2(x-1)$

$\boxed{y = -1/2x + 11/2}$

(c) parallel to $3x + 2y = 5$ and goes thru $(1,0)$

$2y = 5 - 3x$

$y = 5/2 - 3/2x$ ($m_1 = -3/2$)

// same $m = -3/2$ $\Rightarrow$ $y - 0 = -3/2(x-1)$

$\boxed{y = -3/2x + 3/2}$

2.) # 65 on p 122

☆ # 63

Algebra Test Results on Monday!
→ 1.7, 1.8 may be turned in on Monday.

§ 1.9 (very brief overview)

CALCULATORS OUT!!

Main Features

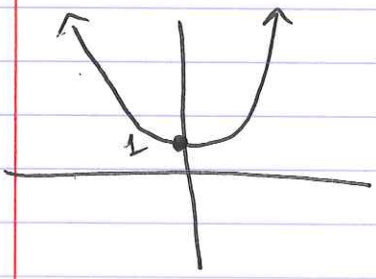
1.) graphing functions.

Practice:

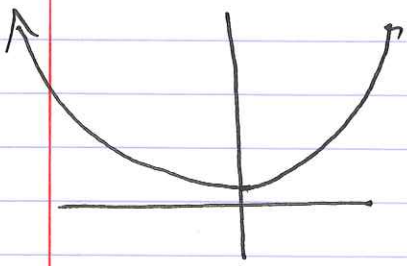
Sketch $y = x^2 + 1$

(a) in $[-10, 10]_1 \times [-10, 10]_1$

x values y-values

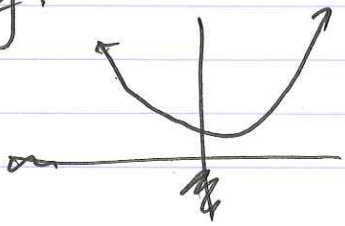


(b) in $[-5, 5]_1 \times [-20, 20]_2$



Observe, Q III, IV are empty.

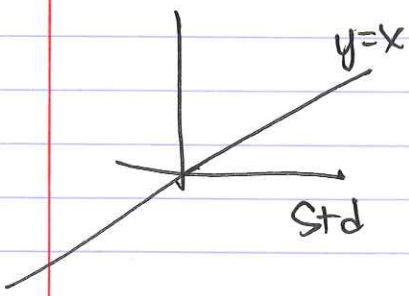
$\Rightarrow$ Set $y_{min} \geq 0$.

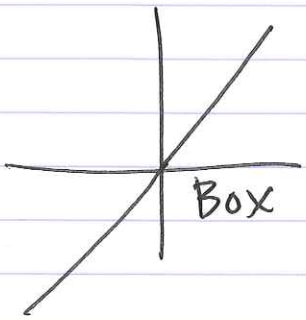


"Shortcuts" to adjusting your window:

2.) Zoom feature.

1: ZBox → makes a 1-1 scale b/t x and y-valus





6: Z Standard

0: Zoomfit : auto adjust to attempt to put entire graph into view.

Example:

Graph: $x^4(100-x^2)(x+50)=y$

↳ Zoomfit fails (we know graph should look like an "S")

How can we improve this window?

3.) Table + our Brains

Table

↳ TBLSET

Window

Indep: Auto ↑ Calc fills in x's

Ask ↑ user enters in x's

Dep: ALWAYS set to Auto

You guys! (20 mins - turn in 1 sheet per pair.)

1.) Find the x-intercepts, rounded to 2 decimal places.

$$y = \sqrt{x} + x - x^2$$

2.) Solve the equation, " "

$$x^4 = x^3 - x^9$$

3.) Solve the inequality, " "

$$(x+1)^2 < (x-1)^2$$