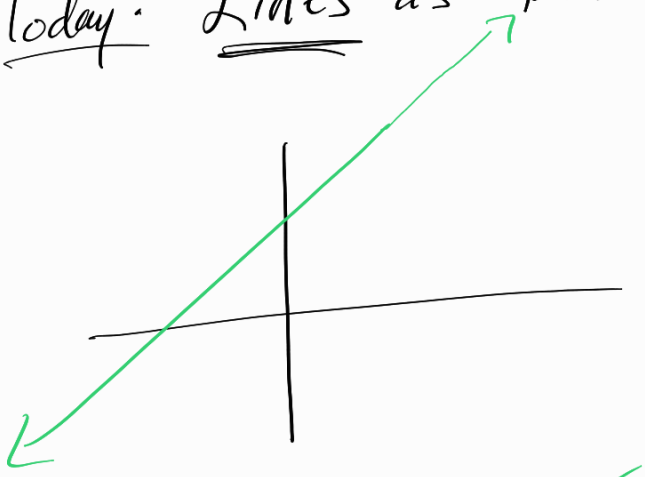
- Make up exams in Solutions

Today: Lines as functions



Geometrically

Shortest path

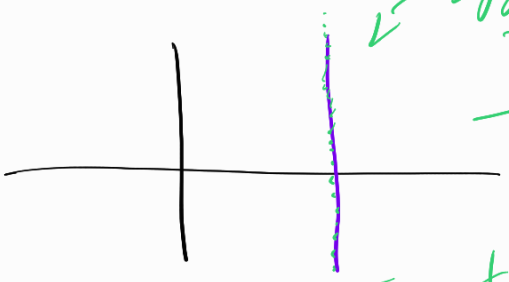
bt 2 pts

Algebraic

$y = mx + b$

m = "slope"

b = "y-int"



← biggest F ever

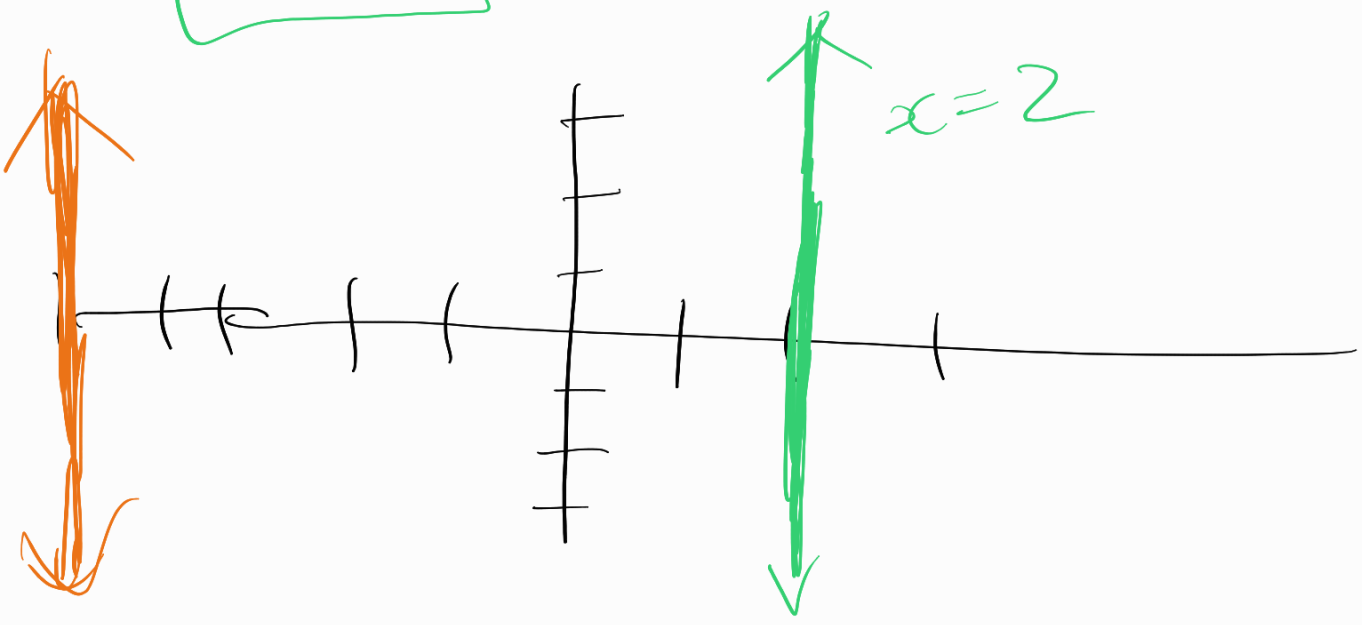
rc not a function!

vertical lines $x = a\ \#$

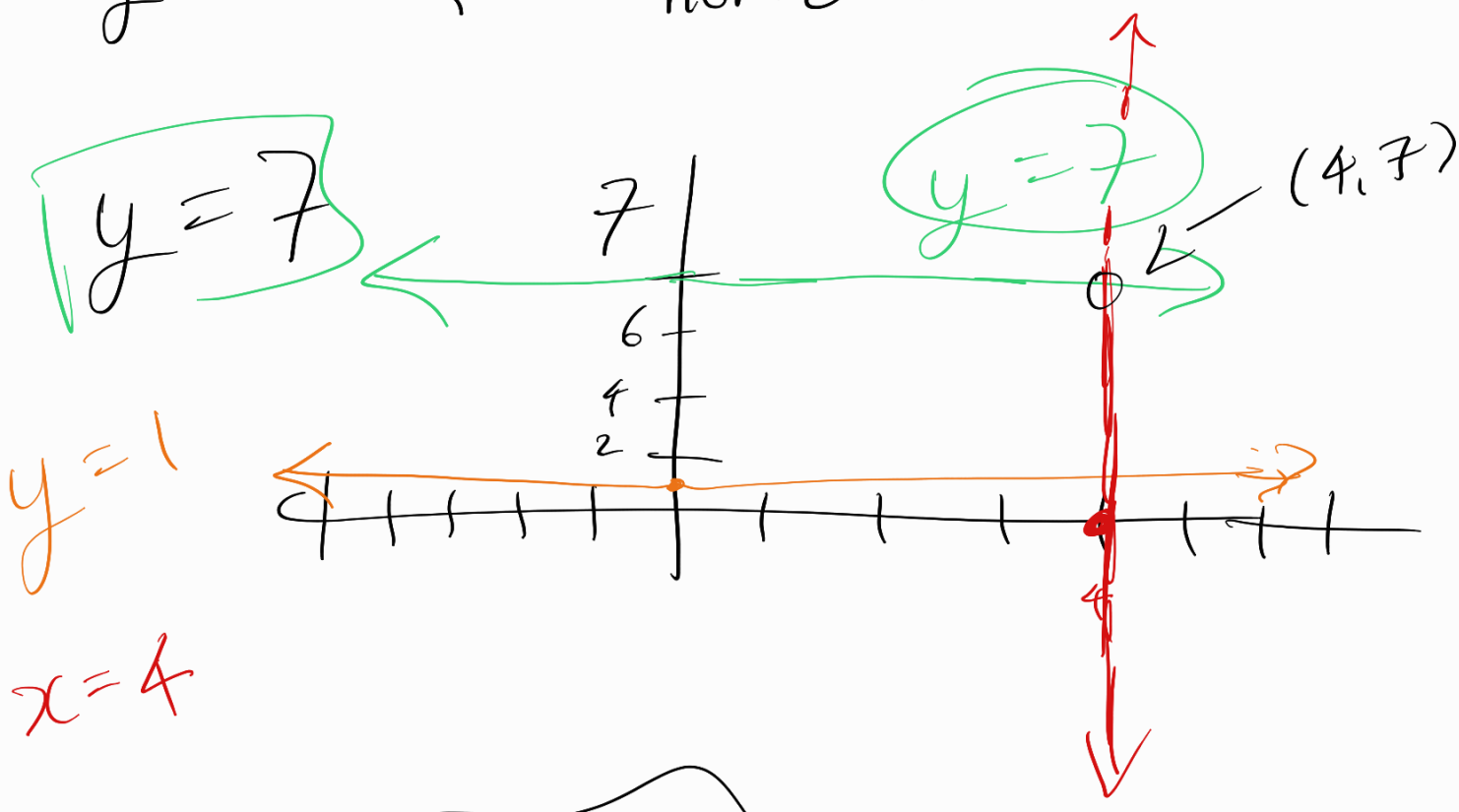
$x = 2$

$x = -5$

vertical lines



$y = \#$ ← horizontal lines



everything else...

$$y = mx + b$$

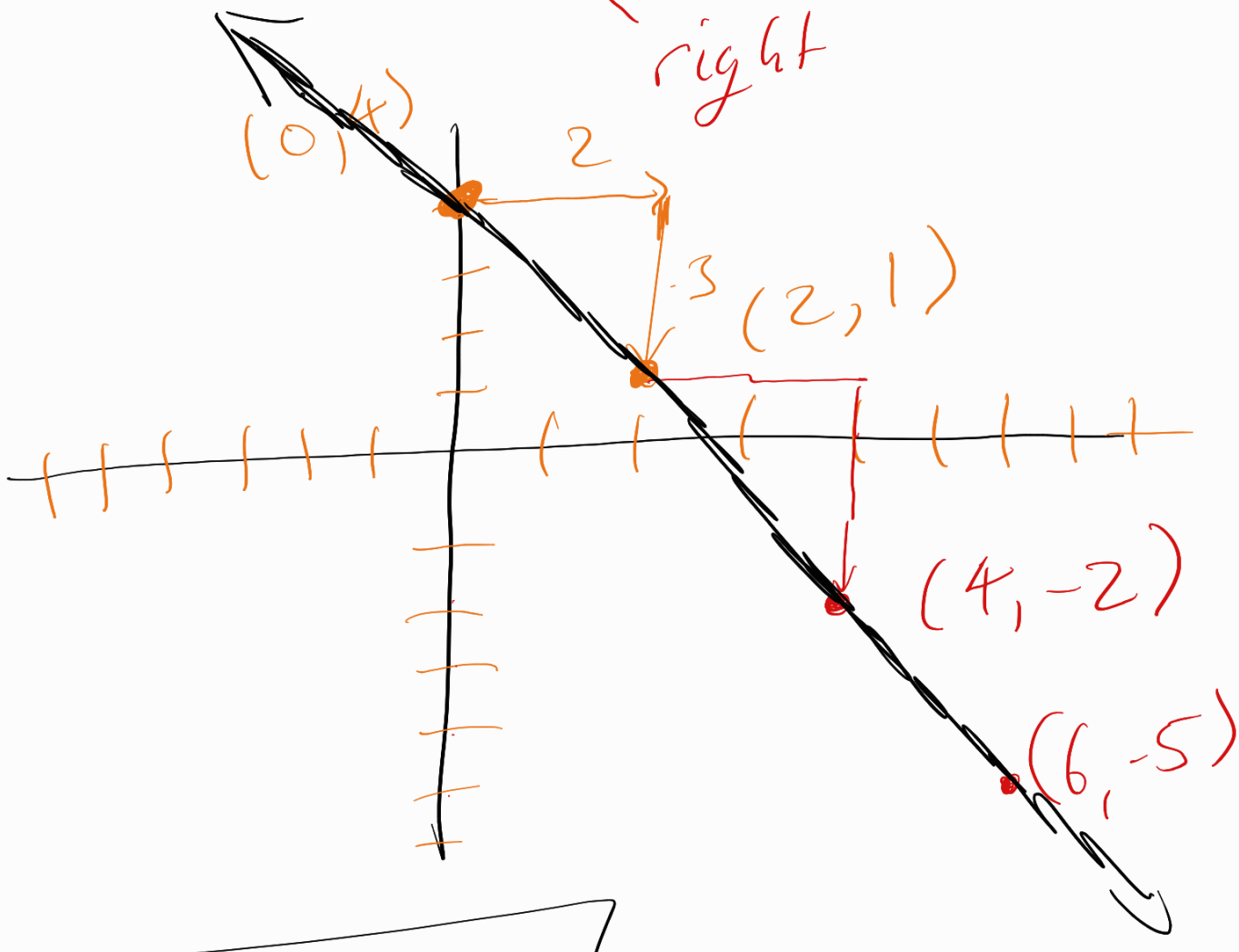
$m =$ "slope" $= \frac{\text{rise}}{\text{run}}$

$b =$ "y-int"

Example: $y = \frac{-3}{2}x + 4$

slope: $\frac{-3}{2}$ ← down, ← right

y-int: 4

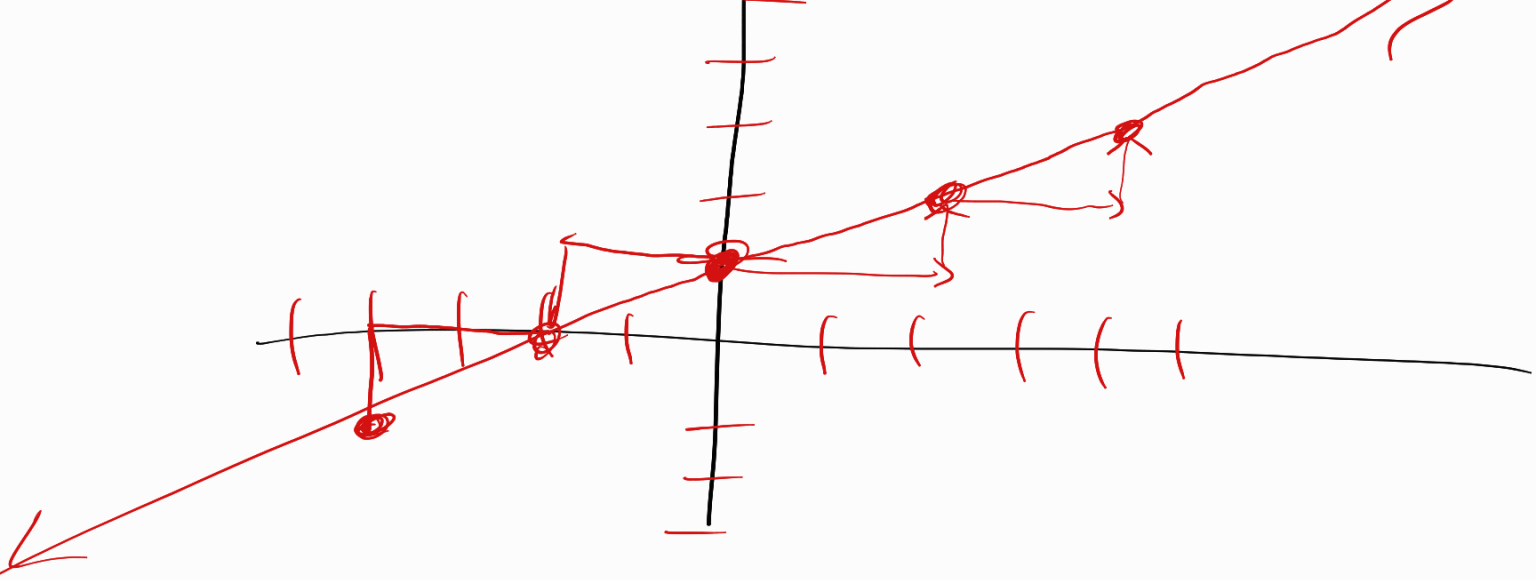


$$y = \frac{1}{2}x + 1$$

Q1: slope? $\downarrow 1/2$

y-int? (0, 1)

Q2: What's graph look like?



$y = 3x - 1$

$\nearrow$

slope $= \frac{3}{1}$

(1, 2) and (-3, 5)

give me the line eq passing thru these 2 pts

$y = mx + b$

① compute slope

② find b (plug in one of given pts)

① compute slope

$$\frac{\Delta y}{\Delta x} = \frac{5 - 2}{-3 - 1} = \frac{3}{-4}$$

$$\text{slope} = \frac{-3}{4} = \frac{-3}{4} = \frac{3}{-4}$$

$$\frac{-3}{-4}$$

cringe

② find b

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

(1, 2)
x y

$$2 = -\frac{3}{4}(1) + b$$

$b = 2 + \frac{3}{4}$

$$y = -\frac{3}{4}x + \left(2 + \frac{3}{4}\right)$$

$(20, 23)$ and $(1, -1)$

Find line passing these 2 pts.

① compute slope ② plug in a pt $\rightsquigarrow$ isolate b

$$m = \frac{23 - (-1)}{20 - 1} = \frac{24}{19}$$

$$y = \frac{24}{19}x + b$$

$$-1 = \frac{24}{19}(1) + b$$

Final ans:

$$y = \frac{24}{19}x + \left(-1 - \frac{24}{19}\right)$$

$b = -1 - \frac{24}{19}$

$y = \frac{3}{5}x - \frac{16}{5}$

is $(5, 2)$ on the line?

No

$2 \neq \frac{3}{5}(5) - \frac{16}{5}$

$\frac{15}{5} - \frac{16}{5} = \frac{-1}{5}$

is $\left(0, -\frac{16}{5}\right)$ on the line?

YES!!

Quiz on lines next week!!