

9/24/ Preca

Quiz 9

1

$$x^4 - 5x^2 - 6 = 0$$

$$y = x^2$$

$$y^2 - 5y - 6 = 0$$

$$(y-6)(y+1) = 0 \quad y = 6, -1$$

$$x^2 = 6$$

$$x^2 = -1$$

no solution

$$x = \pm \sqrt{6}$$

2

$$\sqrt{x+2} = x-4$$

$$x+2 = \underline{\underline{(x-4)^2}} = x^2 - 4x - 4x + 16$$

FOIL F O I L

$$x+2 = x^2 - 8x + 16$$

$$0 = x^2 - 9x + 14$$

$$-4 \quad -2$$

"

$$(x-2)(x-7)$$

$$x = \cancel{2}, 7$$

fails

$$\boxed{x=7}$$

$$\boxed{3} \quad |2x-9|=5$$

$$2x-9=5$$

↓

$$2x = 5+9=14$$

$$\boxed{x=7}$$

$$|u| = \begin{cases} u & u \geq 0 \\ -u & u < 0 \end{cases}$$

$$-2x+9=5 \quad \swarrow$$

$$2x-9=-5 \quad \searrow$$

$$2x=4$$

$$\boxed{x=2}$$

$$\boxed{4}$$

$$\frac{2}{x-3} = \frac{5x}{x^2-9} = \frac{5x}{(x-3)(x+3)}$$

⇓

$$\frac{2(x+3)}{x^2-9} = \frac{5x}{x^2-9}$$

$$\Rightarrow \overbrace{2(x+3)}^{\text{"}} = 5x$$

$$2x+6=5x$$

$$6=3x \Rightarrow \boxed{x=2}$$

Exam 1 → Tuesday
Review sheet

HW due dates extended

Last time: Inequalities

1.7 — algebra manipulation
| | abs value

$$\begin{cases} |u| \leq a \Rightarrow -a \leq u \leq a \\ |u| > a \Rightarrow u > a \text{ or } u < -a \end{cases}$$

1.8 — poly ratics
rational

- ① rewrite to compare with 0
- ② set top/bottom $\Rightarrow$
- ③ Test intervals

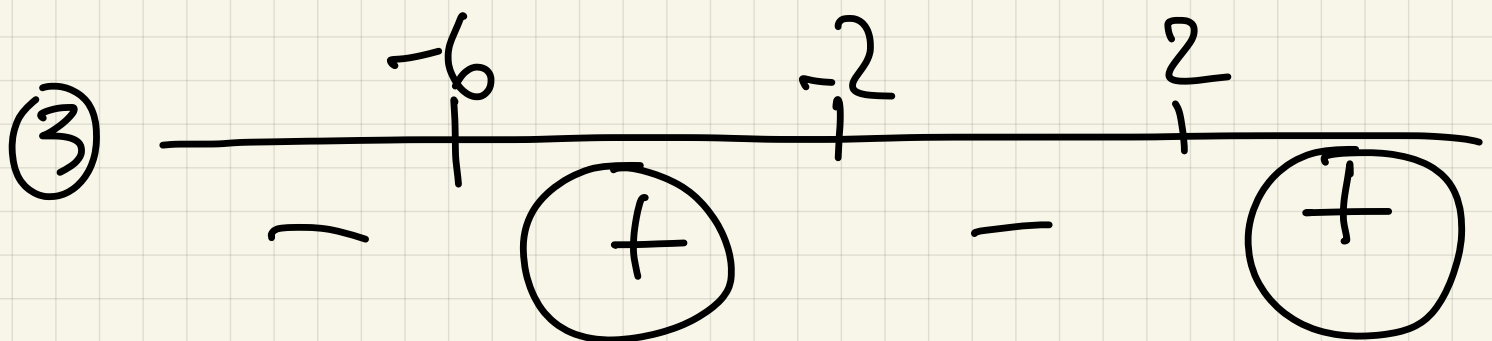
Ex 1 $\frac{2}{x-2} \geq \frac{1}{x+2}$ (Not always true)

① $\frac{2}{x-2} - \frac{1}{x+2} \geq 0$

$$\frac{2(x+2) - (x-2)}{(x-2)(x+2)} \geq 0$$

② $\frac{x+6}{(x-2)(x+2)} \geq 0$

$= 0 \Rightarrow x = -6, -2, 2$



$[-6, -2] \cup [2, \infty)$ but DNE ± 2

$$[-6, -2) \cup (2, \infty)$$

2.1 linear equations in 2 variables

$$Ax + By = C$$

equations of lines in
 $x-y$ plane

$$B = 0 \Rightarrow x = \frac{C}{A} \text{ vertical lines}$$

$$B \neq 0 \Rightarrow By = -Ax + C$$

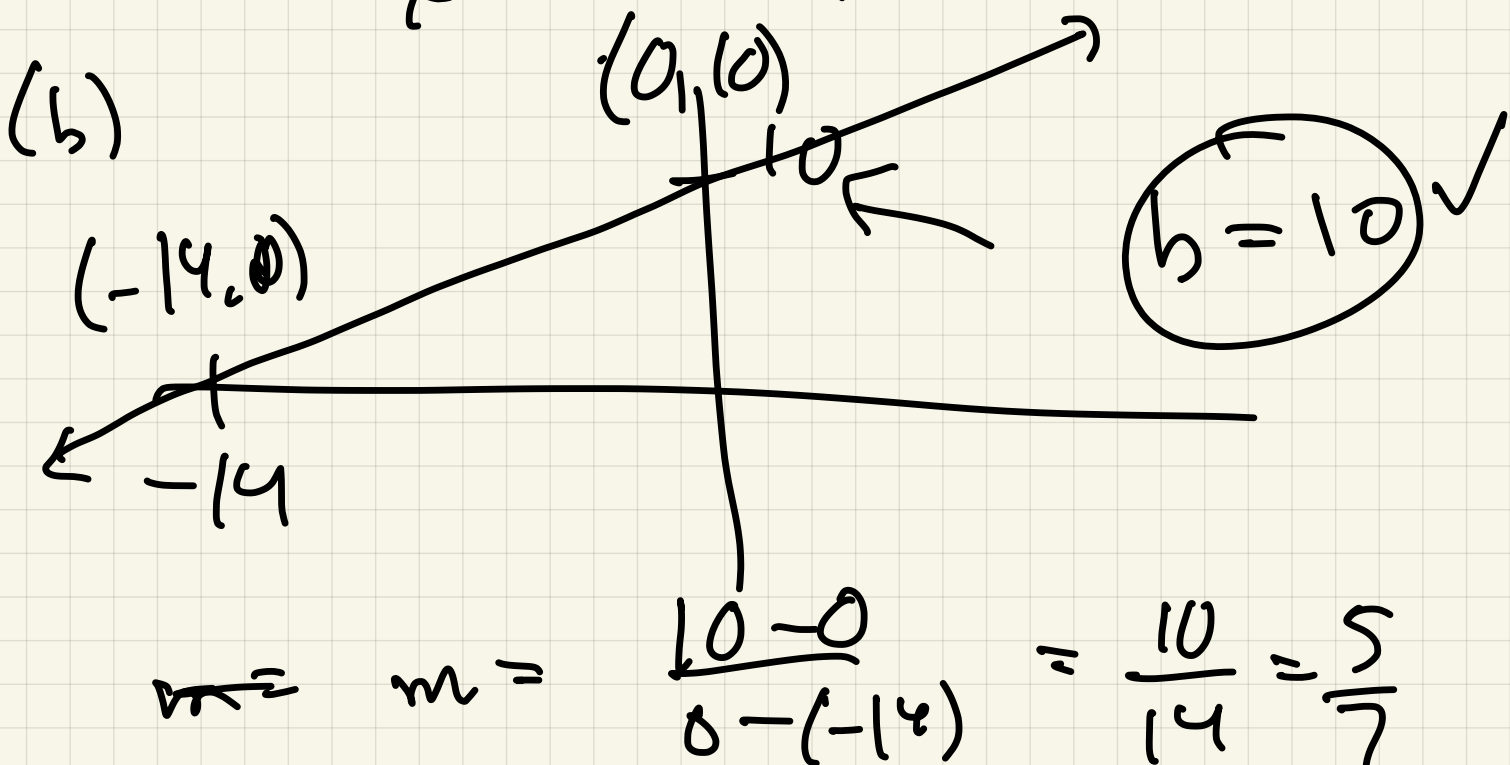
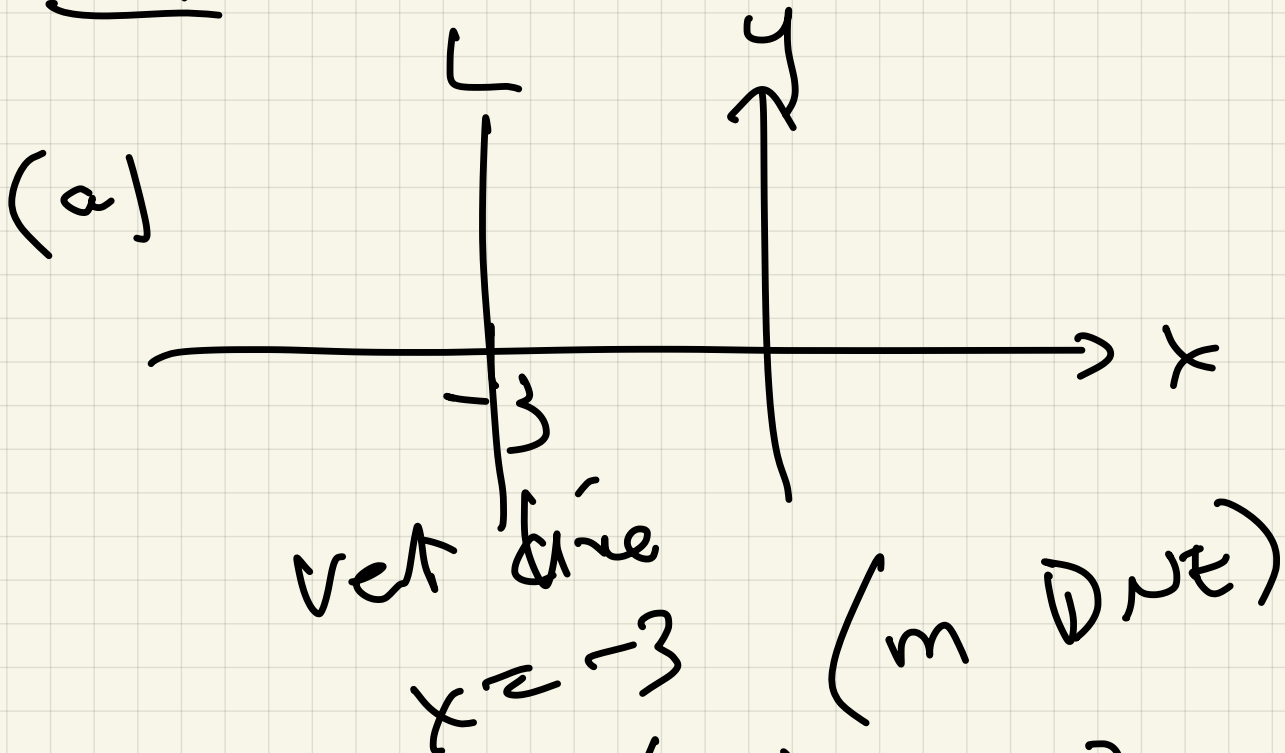
$$y = \left(\frac{-A}{B}\right)x + \left(\frac{C}{B}\right)$$

$$y = \underset{\neq 0}{\underbrace{m}}x + \underset{\neq 0}{b}$$

Slope & y-int

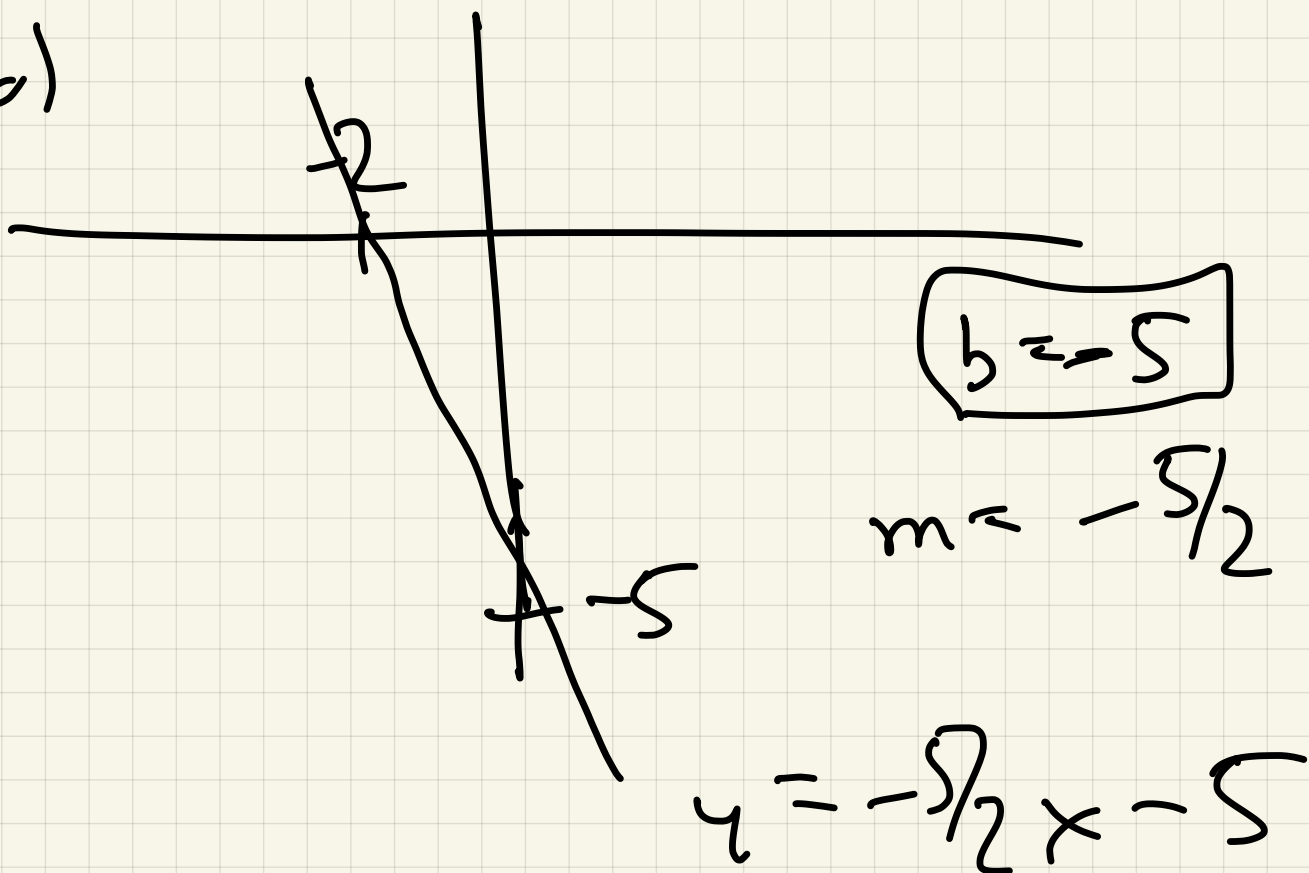
Graph $\longleftrightarrow$ Equation

Ex 1 Find equations of lines:

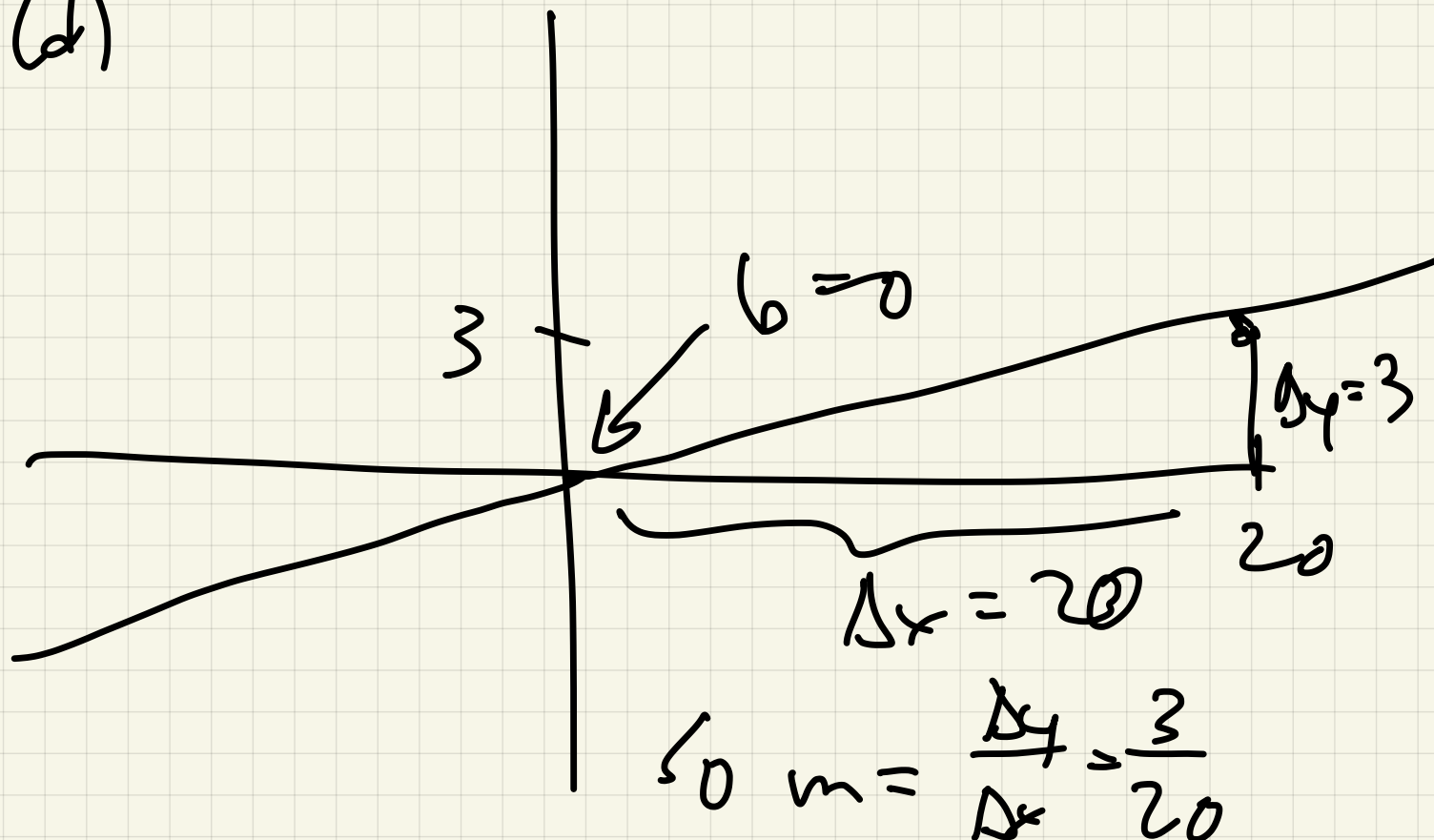


so $y = \frac{5}{7}x + 10$

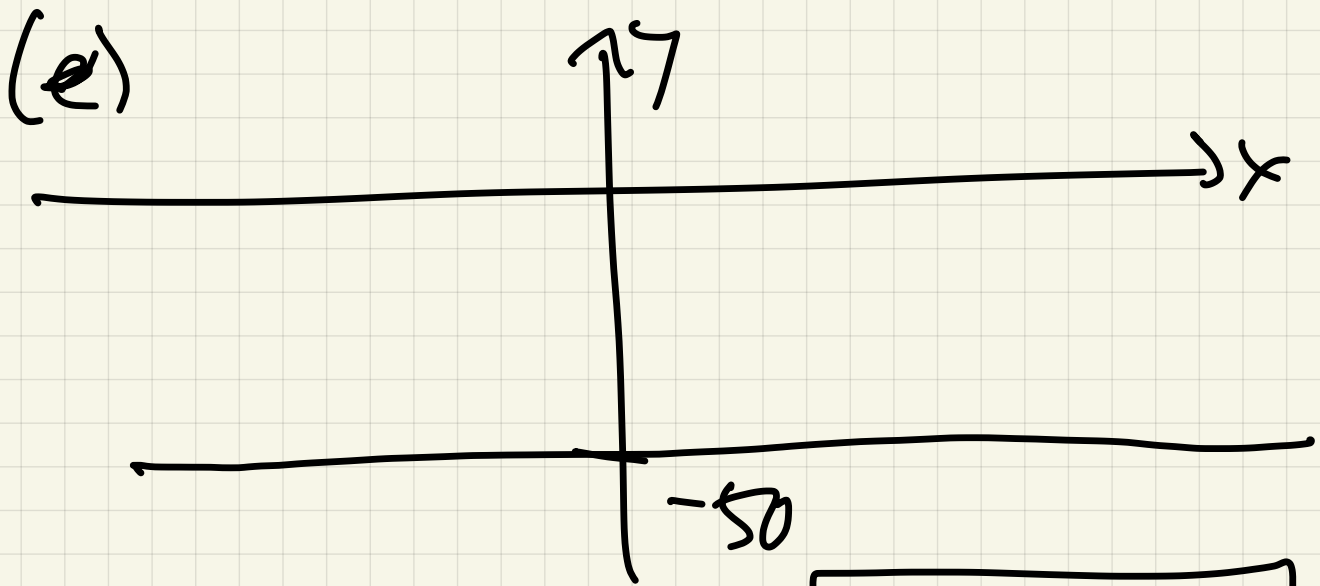
(c)



(d)



$$S_0 \quad y = \frac{3}{20}x$$



$$m = 0$$

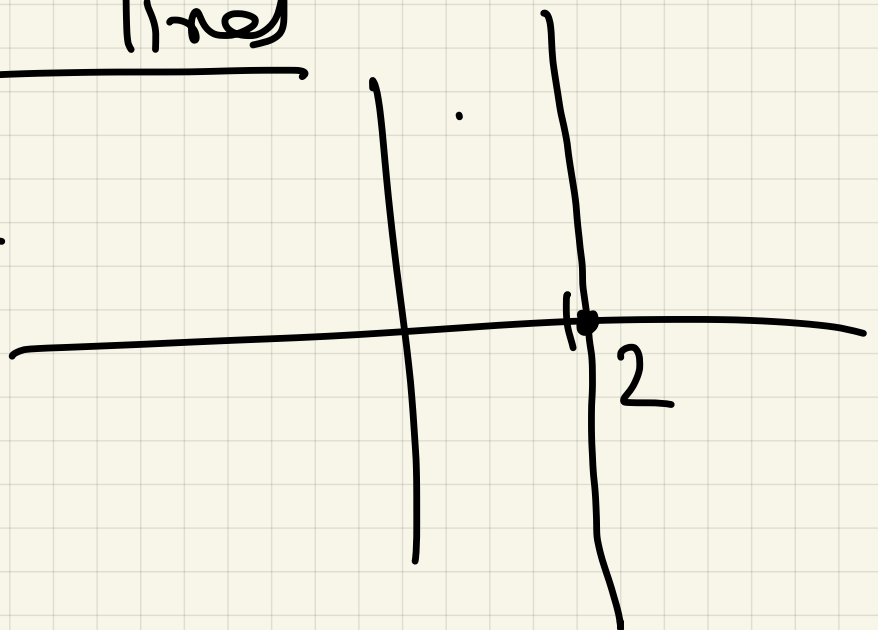
$$b = -50$$

$$y = -50$$

horizontal line

Ex 2 Sketch lines

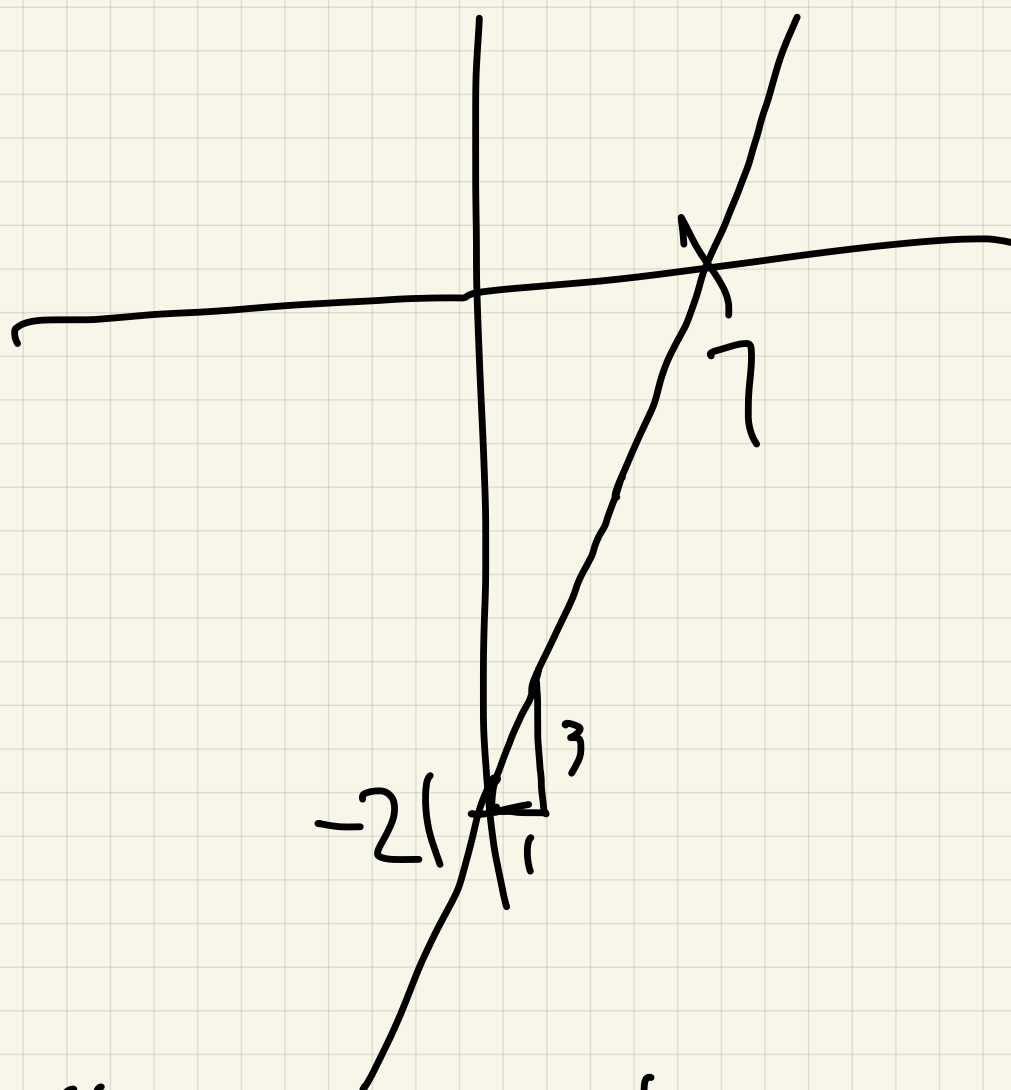
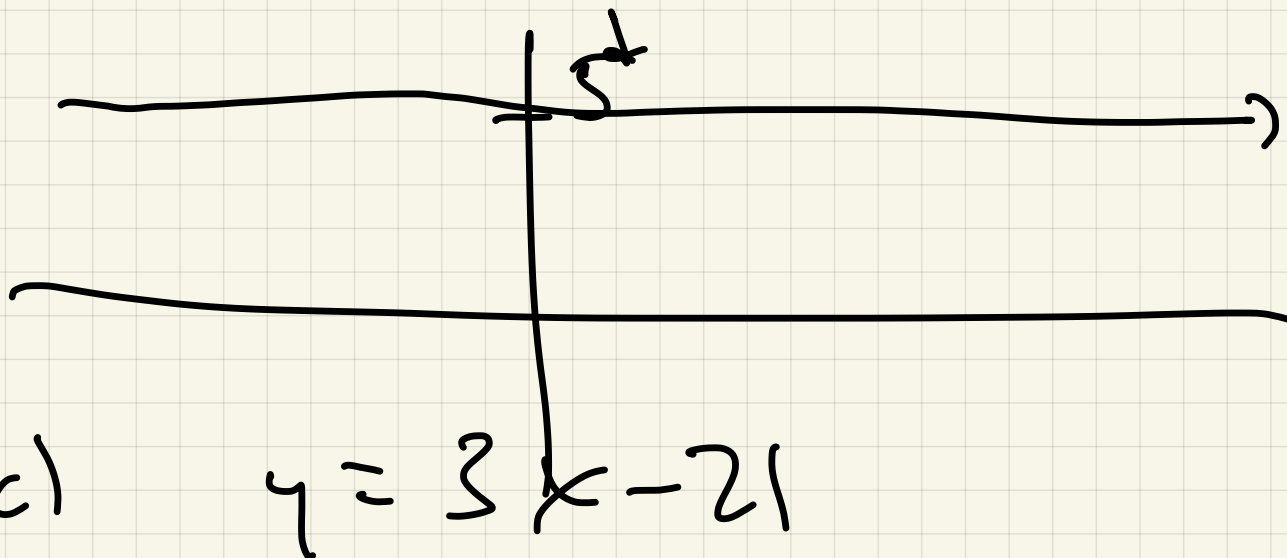
(a) $x = 2$



(b)

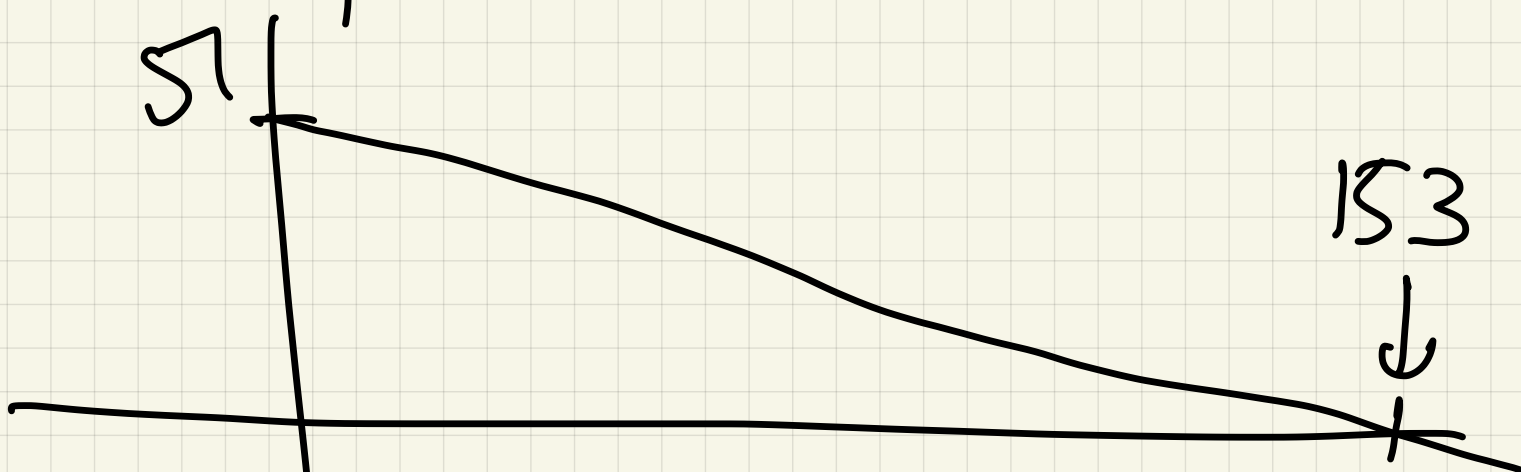
$$y = 5$$

horizontal



(d) $y = -\frac{1}{3}x + 5$

$m = -\frac{1}{3}$ $\uparrow$ $y\text{-int}$



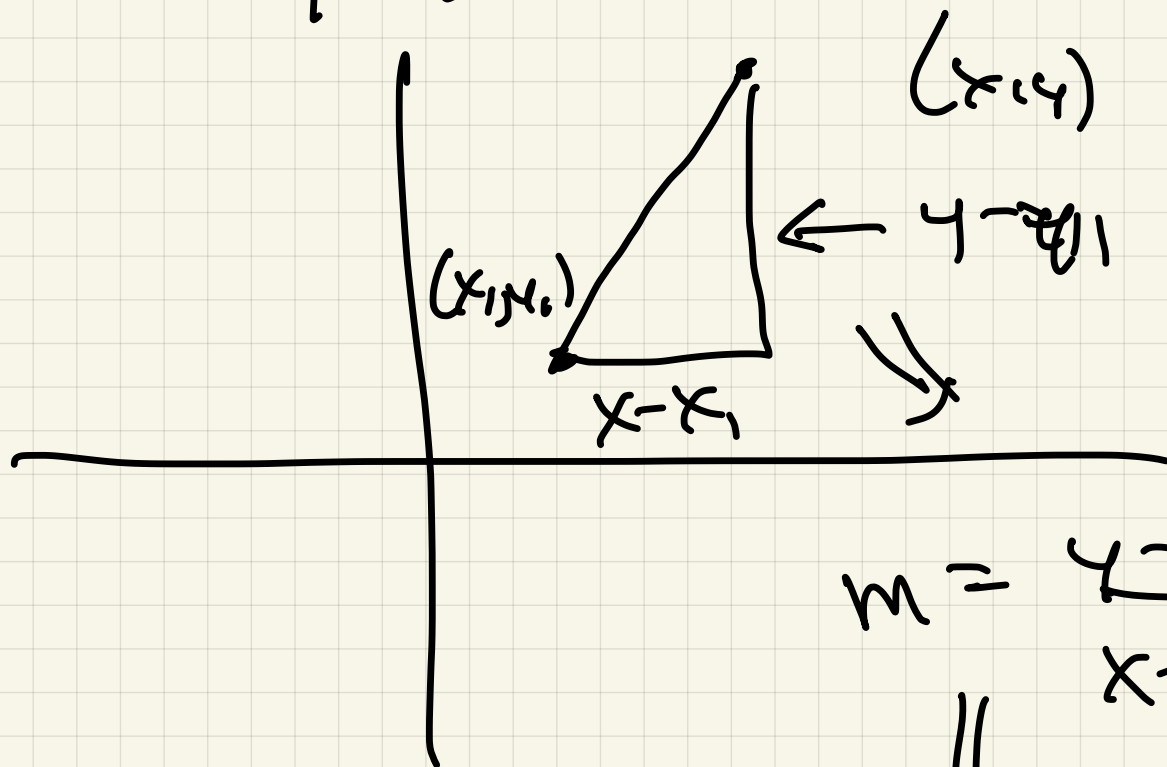
Point-slope form for

equation of a line

If L has slope m and
contains point (x_1, y_1) ,

then L has equation

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



$$m = \frac{y - y_1}{x - x_1}$$

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

Ex)

Find equation of line through

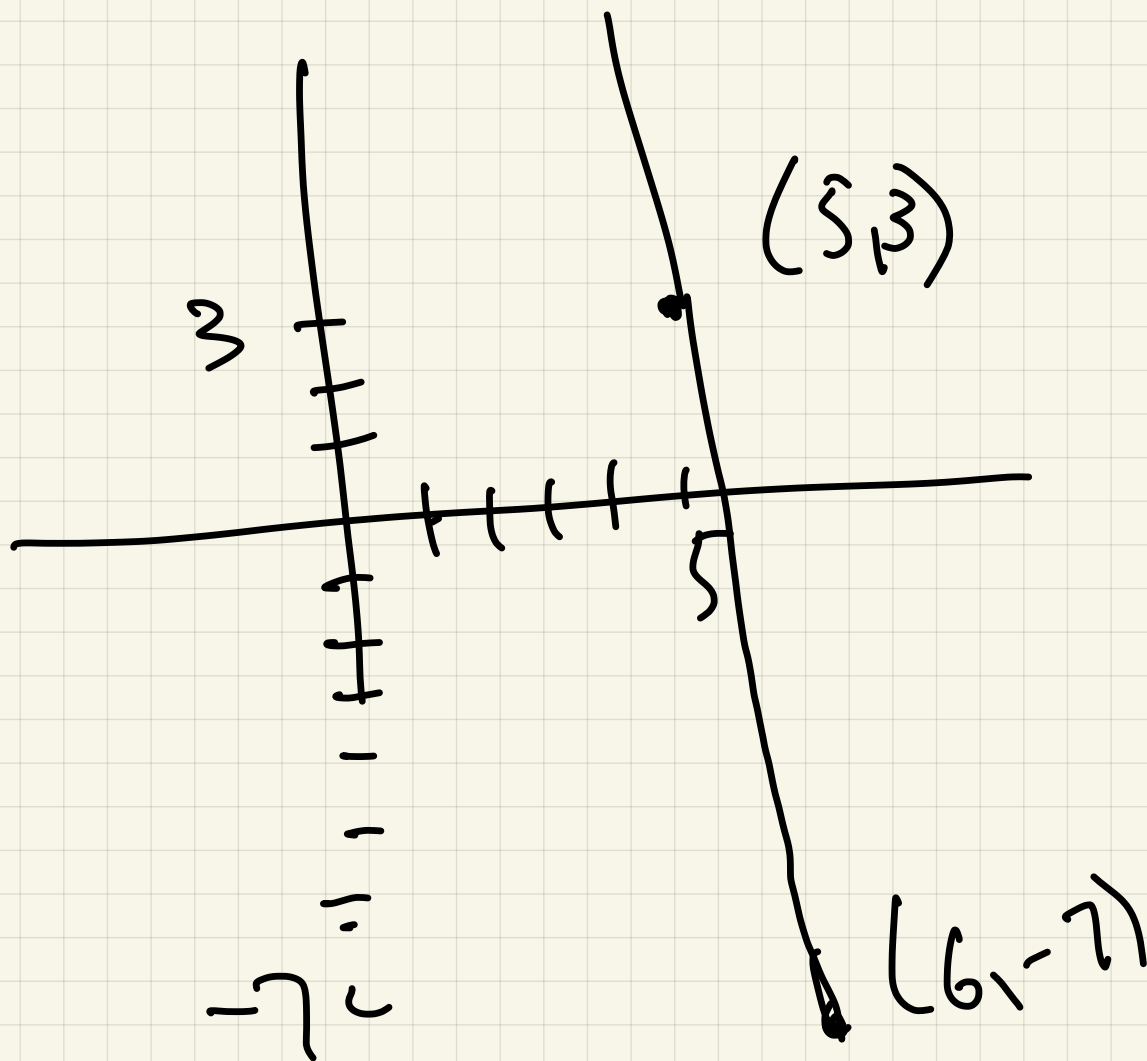
$(5, 3)$

with slope

-10

What are y -int & x -int?

Sketch



$$m = -10 \quad \text{at} \quad (x_1, y_1) = (5, 3)$$

$$y - 3 = -10(x - 5)$$

$$y - 3 = -10x + 50$$

$$y = -10x + 53$$

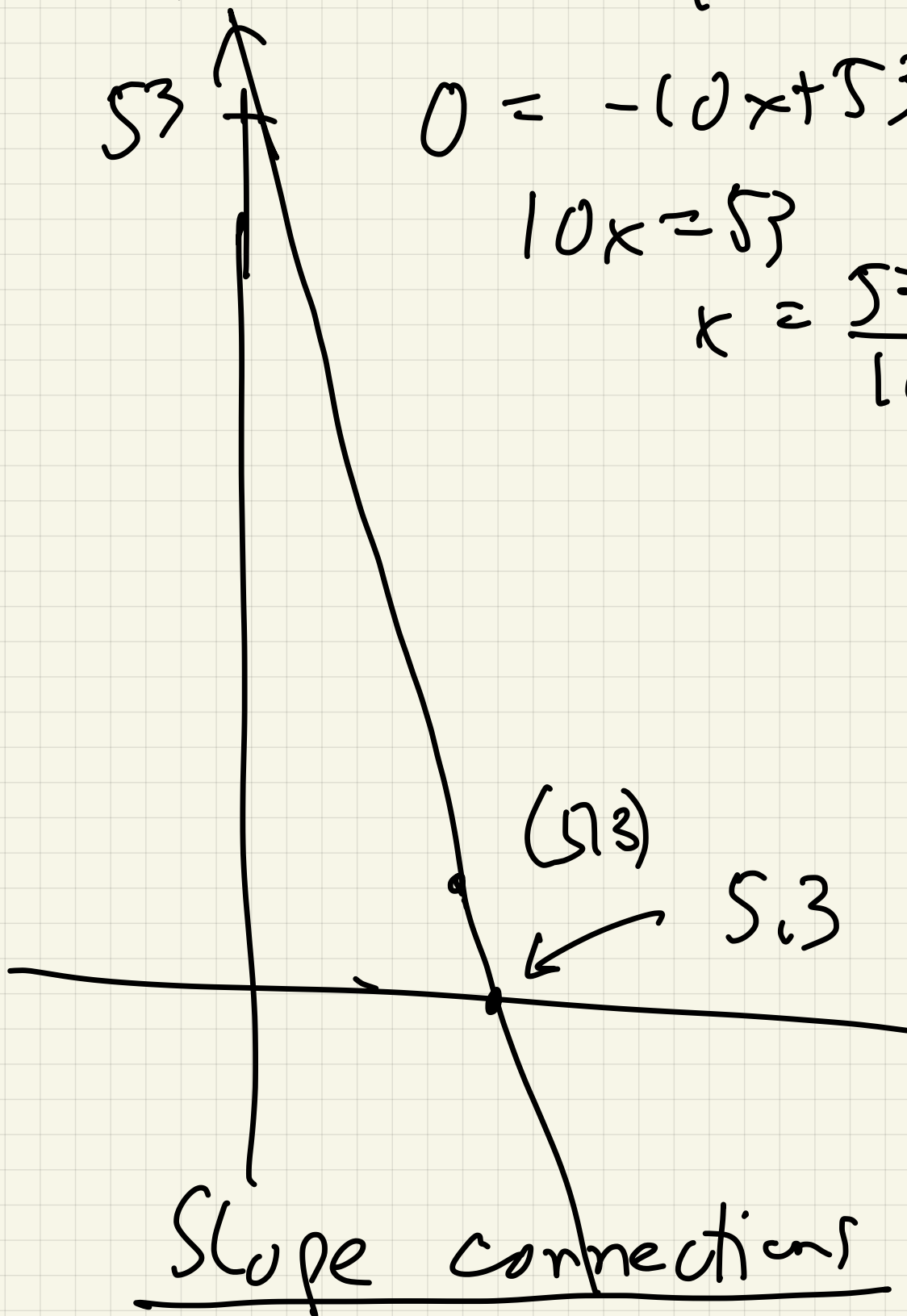
$$y\text{-int} \quad (0, 53)$$

x-int: Set $y=0$

$$0 = -10x + 53$$

$$10x = 53$$

$$x = \frac{53}{10} = 5.3$$



④ Let L_1, L_2 are two lines,
with slopes m_1, m_2 .

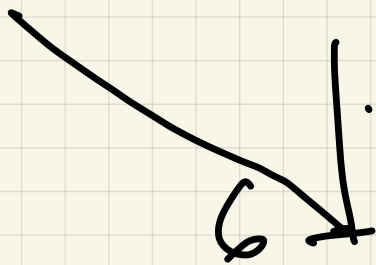
① L_1, L_2 are parallel if $m_1 = m_2$
($L_1 // L_2$ $\nwarrow$ parallel rotation)

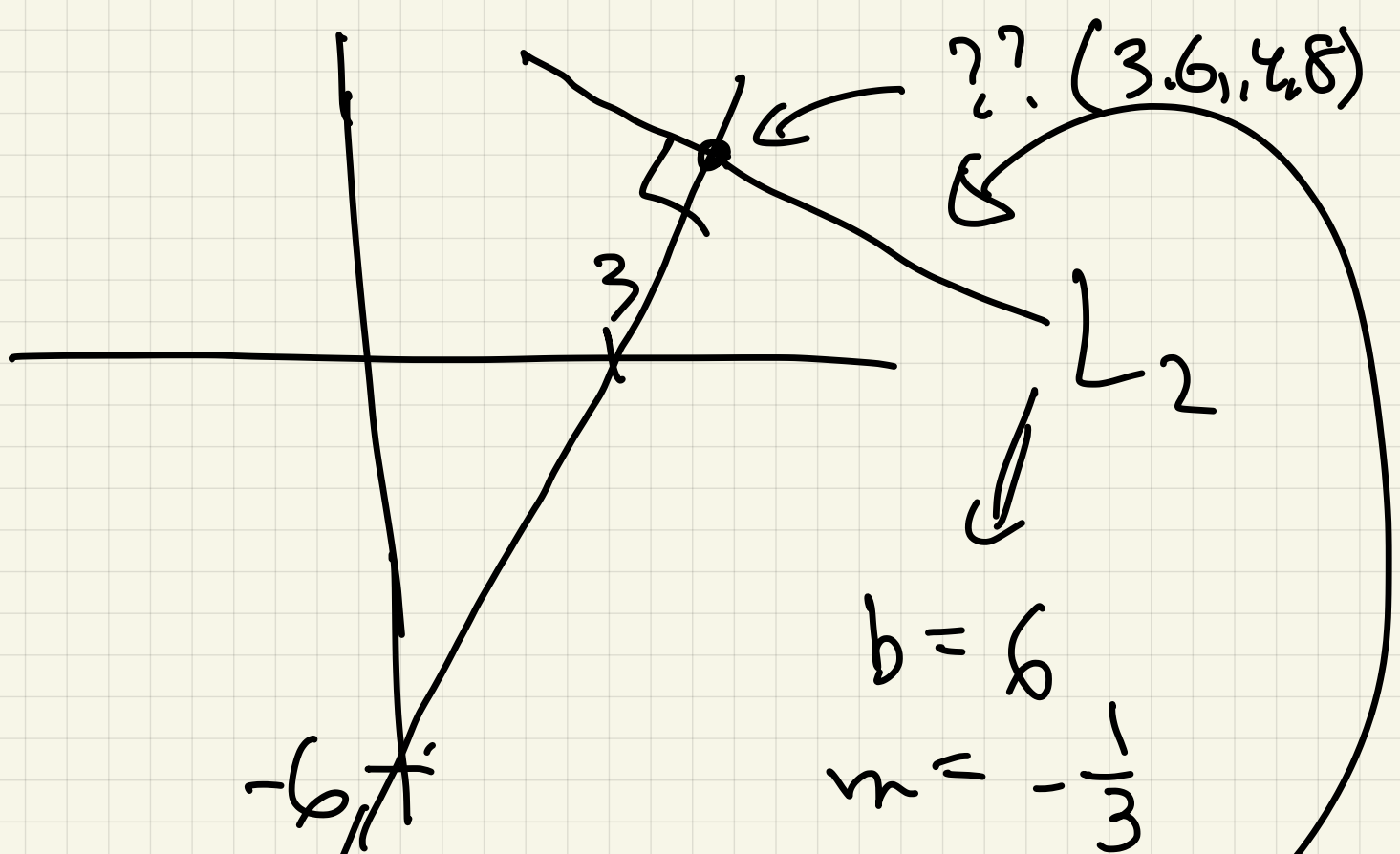
② L_1, L_2 are perpendicular
if $m_1 m_2 = -1$ ($m_2 = -\frac{1}{m_1}$)
(Notation: $L_1 \perp L_2$)

Ex 3 L_1 has equation $y = 3x - 6$

(a) Find the line L_2 with
y-intercept = $(0, 6)$:

where do L_1, L_2 intersect?





$$L_2 \quad y = -\frac{1}{3}x + 6$$

$$L_1 \quad y = 3x - 6$$

$$-\frac{1}{3}x + 6 = 3x - 6$$

$$12 = 6 + 6 = \underline{\underline{\left(3 + \frac{1}{3}\right)x}}$$

$$12 = \frac{10}{3}x$$

so

$$x = 12\left(\frac{3}{10}\right) = \frac{36}{10} = 3.6$$

$$y = 3(3.6) - 6 = 10.8 - 6 = 4.8$$

$$(3.6, 4.8)$$