Franco:

Math 208 Sec I

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(mention which section)

Office Hrs: Monday 11:30 - 1:00
LB-912
(math help centre)

Course Outline: moter-site

Textbook:

Assignments ⇒ 12 ASS
⇒ Done Online (1 every wk)

To register need:
* Access Code
* Course ID: romanelli 15949

Help with MathLab:

⇒ Tech. issues: mymathlab.math

Calc: Math Dept (9th floor) or Bookstore Library

1 Common Mid-Term

Sunday, March 10th, 10 Am

(alt. SAT March 16th, (0 AM)

Grading:

a) 10% ASS

20% MIDTERM

70% Final

(OR)

b) 10% ASS

10% MID

80% Final

CHAP 1

Section 1.2 (GRAPHS and LINES)

STANDARD FORM of a Line

$$Ax + By = C \quad (A \text{ and } B \text{ ~~are~~ NOT BOTH ZERO})$$

(eg) $8x + 3y = 24$? $6x = 12$?

$-2x + 7y = 14$? $-4y = 36$?

GRAPH

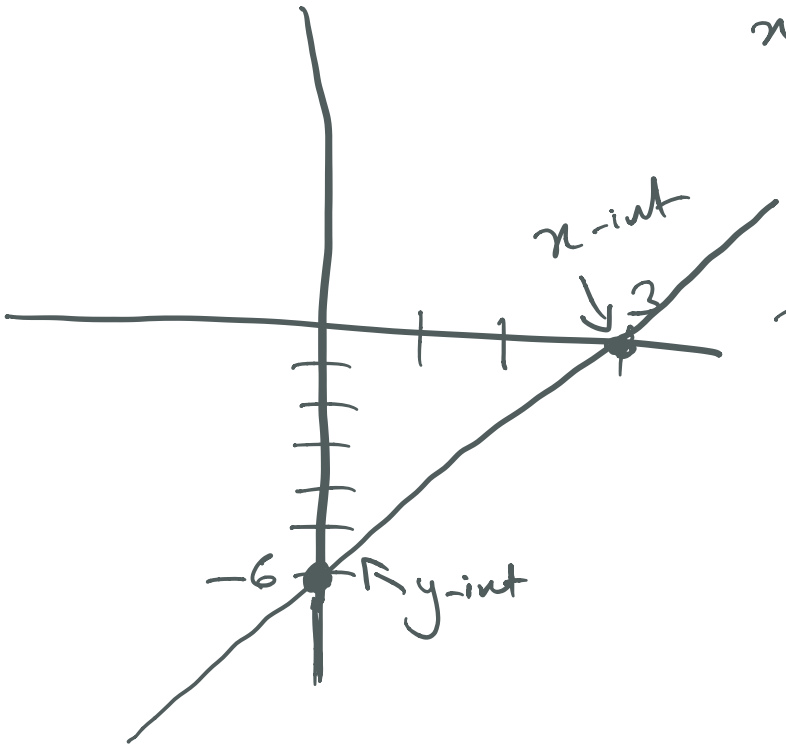
(eg) $2x - y = 6$ (STD form)

Table of values:

x	y
0	-6 → y-int
3	0 → x-int

y-intercept

y-value that crosses the y-axis ($x = 0$)



x-intercept

x-value on graph crosses x-axis ($y = 0$)

$$Ax + By = C$$

If $A=0$, $B \neq 0$

$By = C$

$y = \frac{C}{B}$ graph of horizontal line

(eg) $2y = 5$

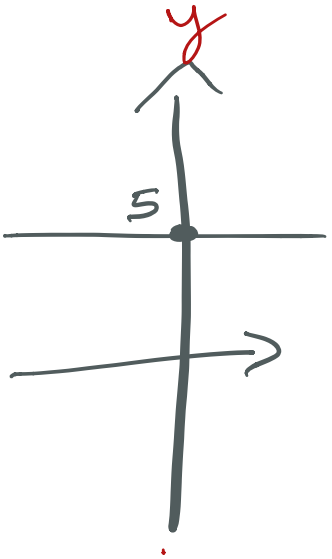
$y = -6$

$-3y = 12$

(ex) $3y = 15$

$y = \frac{15}{3}$

$y = 5$



If $b=0$, $A \neq 0$

$Ax = C$

$x = \frac{C}{A}$ graph of a vertical line

(eg) $5x = 10$

$x = -4$

$-7x = 21$

(ex) $-4x = 8$

$x = \frac{8}{-4}$

$x = -2$

Slope of a line:

Given any 2 points on a line $\begin{cases} P_1(x_1, y_1) \\ P_2(x_2, y_2) \end{cases}$

$$\text{Slope}, m = \frac{y_2 - y_1}{x_2 - x_1}$$

(eg) $P_1(\underset{x_1}{-2}, \underset{y_1}{3})$, $P_2(\underset{x_2}{6}, \underset{y_2}{7})$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-3}{6-(-2)} = \frac{4}{8} = \frac{1}{2} \text{ (+)}$$

(ex) $P_1(0,4)$ $P_2(-2,10)$

$$m = \frac{10-4}{-2-0} = \frac{6}{-2} = -3 \ (-)$$

Also,

$P_1(5,2)$
$P_2(-1,2)$

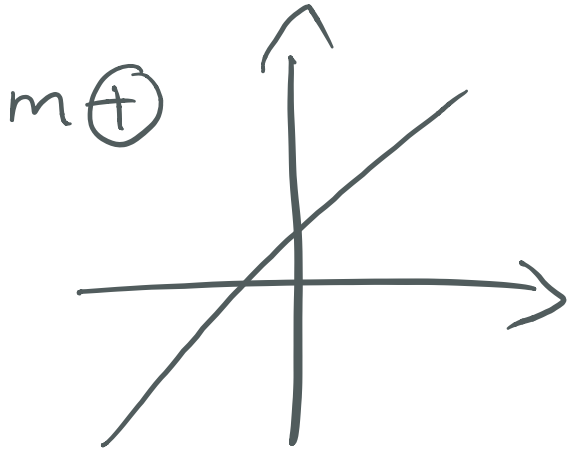
$$m = \frac{2-2}{5-(-1)} = \frac{0}{6} = 0$$

and

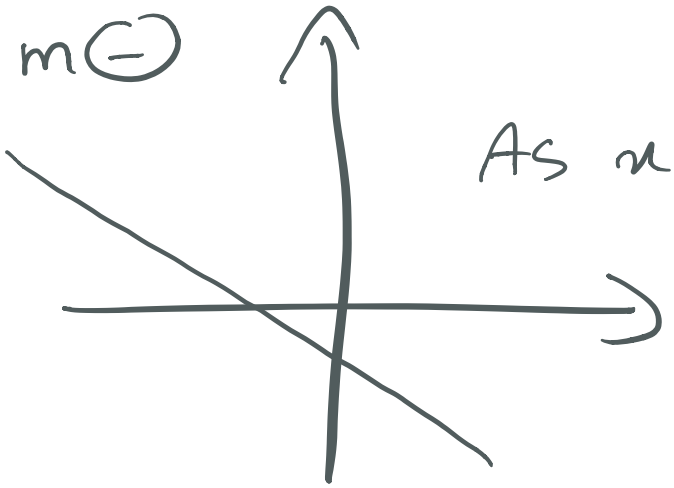
$P_1(3,6)$
$P_2(3,8)$

$$m = \frac{8-6}{3-3} = \frac{2}{0} = \text{undefined.}$$

Graphically:

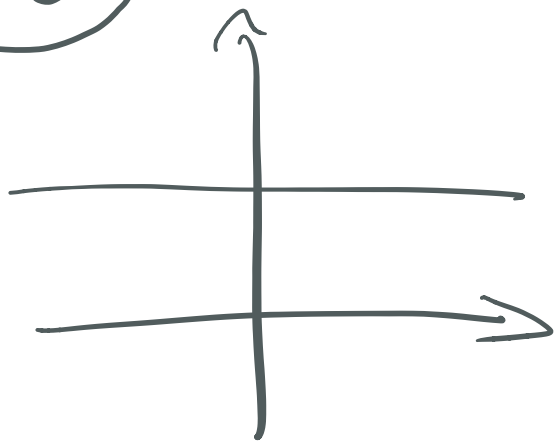


m (−)



As $x \uparrow$, $y \downarrow$

m = 0



(Horizontal line)

m = undefined

vertical line

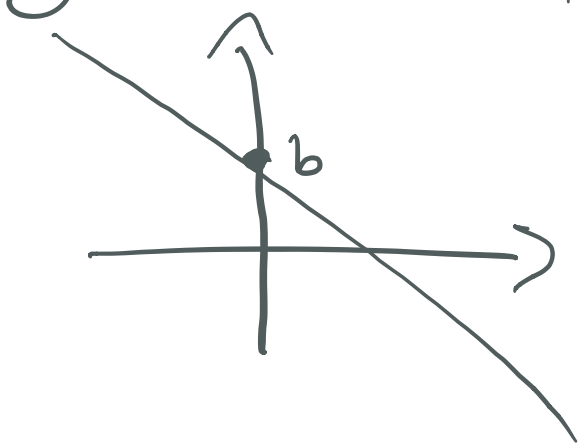
Given STD form:

$$Ax + By = C$$

$$By = -Ax + C$$

$$y = -\frac{A}{B}x + \frac{C}{B}$$

$y = mx + b$ { m = slope, b = y-intercept, slope-intercept form



(eg) $7x + 3y = 9$

$$3y = -7x + 9$$

$$y = -\frac{7x}{3} + \frac{9}{3}$$

$$y = -\frac{7}{3}x + 3 \quad \{m = -7/3, b = 3\}$$

(eg) $y = 5x + 4 \rightarrow m = 5, b = 4$

$y = -x \rightarrow m = -1, b = 0$

$y = -3 \rightarrow m = 0, b = -3$

(Horizontal line)

$x = 5 \rightarrow$ undefined, $b =$ none

(vertical line) (x-intercept $= 5$)

- **Point - Slope form:**

Given slope m of a line and any Point $P(x_1, y_1)$ on the line

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

point - slope form of the line

(eg) $m = 6$, $P(-2, 5)$

x_1 y_1

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

$$y - 5 = 6(x - (-2))$$

$$y - 5 = 6(x + 2)$$

$$y - 5 = 6x + 12$$

$$\boxed{y = 6x + 17}$$

(or) $-6x + y = 17$ (STD form)

(OR) Another method:

$m = 6 \quad P(-2, 5)$

$y = mx + b$

$5 = 6(-2) + b$ → find "b"

$5 = -12 + b$

$5 + 12 = b \quad | \quad , 17 = b$

$y = 6x + 17$

Find Eq of the line that goes thru the 2 points:

(eg) 2 points $\begin{pmatrix} P_1(-3, 4) \\ P_2(2, -6) \end{pmatrix}$

Find slope first

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 - 4}{2 - (-3)}$$

$$= \frac{-10}{5} = -2$$

$\therefore m = -2$, then choose P_1 or P_2

$P_1(-3, 4) \rightarrow y = mx + b$

$4 = 2(-3) + b$

$4 = 6 + b$

$4 - 6 = b$

$b = -2$

$\therefore y = -2x - 2$

APPLICATIONS:

x = # of doughnuts here

(eg) A doughnut shop has a fixed cost of $124 per day and variable costs of 0·12 cents per doughnut.

First find Total daily cost:

Total Daily Cost of producing 'x' doughnuts

$C(x)$ = fixed cost + variable cost

$C(x) = 124 + 0{\cdot}12x$

$C(x) = 0{\cdot}12x + 124$

(Qs) How many doughnuts can be produced for a daily cost of $250.

$C(x) = 250$, $x = ?$

$250 = 0{\cdot}12x + 124$

$250 - 124 = 0.12x$

$$\frac{126}{0.12} = \frac{0.12x}{0.12}$$

$\therefore x = 1050$ doughnuts

(eg) A charter fishing company buys a new boat for 224 000 and assumes a trade value of 115 200 in 16 yrs.

P_1 (0 , 224 000) — time (t), \$

P_2 (16 , 115 200) — (t), (\$)

i) a) Find value $v(t)$ of the boat at any time (t).

$$m = \frac{115200 - 224000}{16 - 0} = \frac{108800}{16} = -6800$$

$b = ?$

$b = 224000$ (from P_1 at $t(0)$)

Rule $V(t) = -6800t + 224000$

(b) What is value of boat in 10 yrs?

$$V(10) = -6800(10) + 224000$$

$$= 156800$$

(c) When is the value at the boat 100,000

$$100\,000 = -6800t + 224000$$

$$100000 - 224000 = -6800t$$

$$-124000 = -6800t$$

$$t = \frac{-124000}{-6800} \approx 18.234 \text{ yrs.}$$