Math 115

Fall 2018

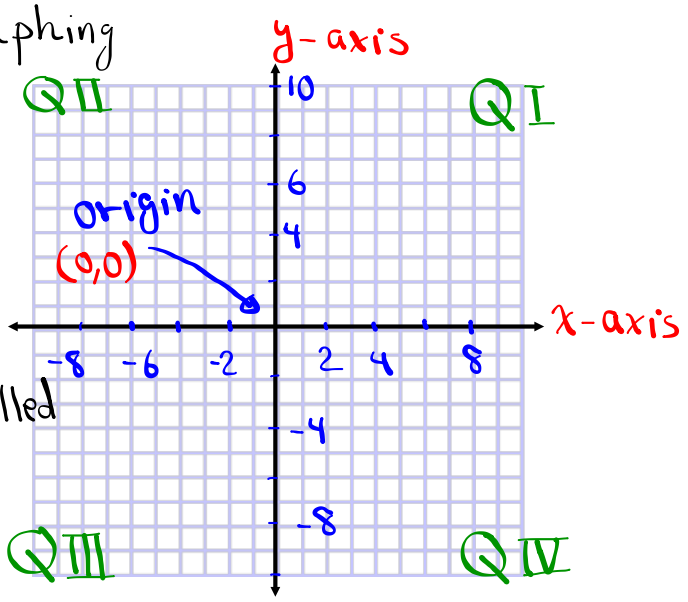
Lecture 9

$? \; a^2 + b^2 = c^2 \; ?$

$y = mx + b \quad ? \quad d = rt$

Intro. to graphing

Rectangular Coordinate System



Points are called ordered-pairs

(x, y)

ex: $A(-3, 5)$

$B(\overset{x}{7}, \overset{y}{-2})$

$C(\overset{x}{0}, \overset{y}{4})$

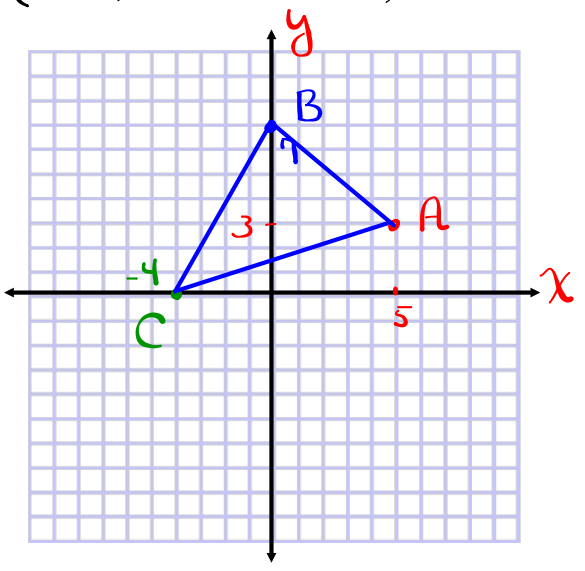
$D(\underset{x}{-2}, \underset{y}{0})$

Plot A(5,3), B(0,7), and C(-4,0), then draw triangle ABC.

A is in QI

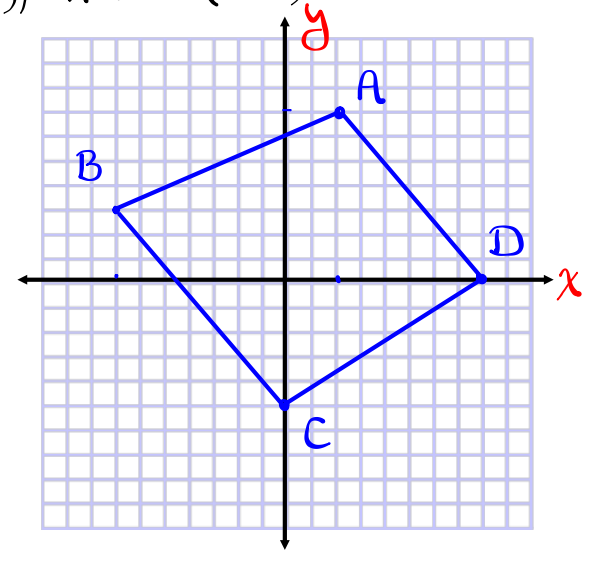
B is on Y-axis

C is on x-axis

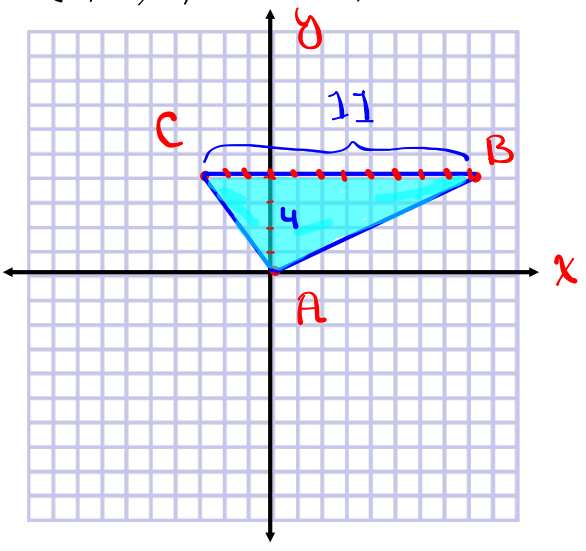


Draw the polygon ABCD where A(2,7), B(-7,3), C(0,-5), and D(8,0).

Polygon is a closed geometric shape



Find the area of the triangle ABC with A(0,0), B(8,4), and C(−3,4). Drawing required.



$A = \frac{b \cdot h}{2}$

$h = 4$

$b = 11$

$A = \frac{11 \cdot 4}{2}$

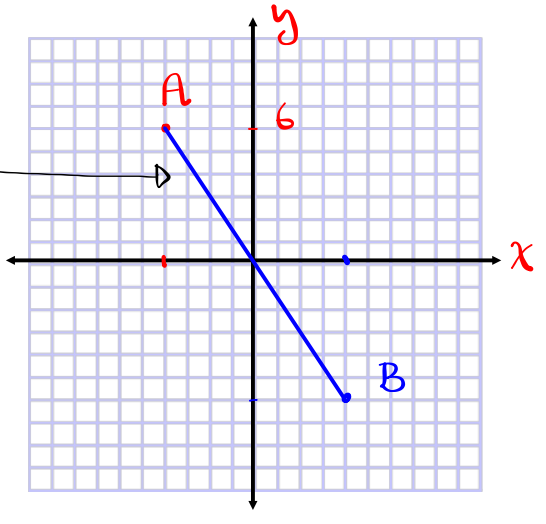
$= 22 \text{ units}^2$

Line Segment $\overline{AB}$ connects A to B.

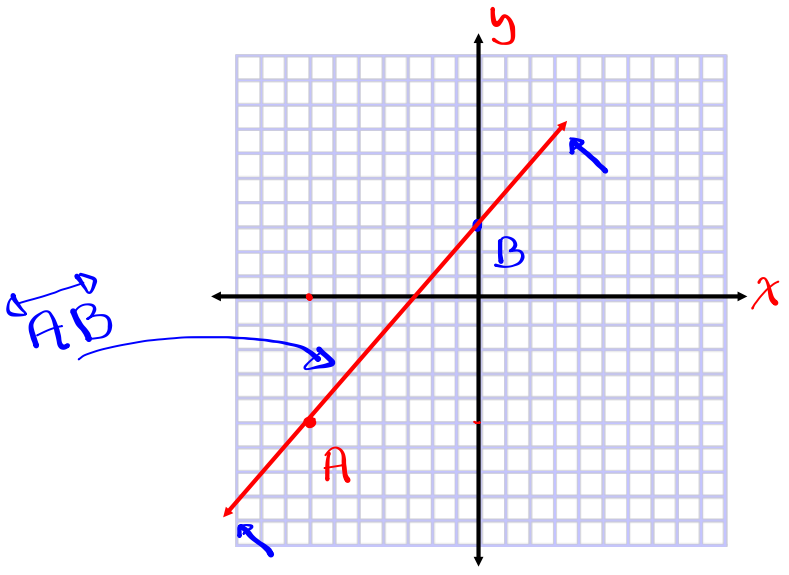
Line $\overleftrightarrow{AB}$ connects and extends from A to B.

Draw $\overline{AB}$ with A(−4,6) and B(4,−6)

Line Segment



Draw $\overleftrightarrow{AB}$ with $A(-7,-5)$ and $B(0,3)$.

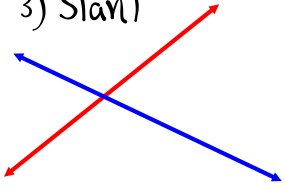


Type of Lines:

1) Vertical

2) Horizontal

3) Slant



Equation of lines

1) Vertical

$x = a$

$x=4,$

$x=-2$

2) Horizontal

$y=b$

$y=3$

$y=-5$

3) Slant

$Ax+By=C$

$y=mx+b$

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

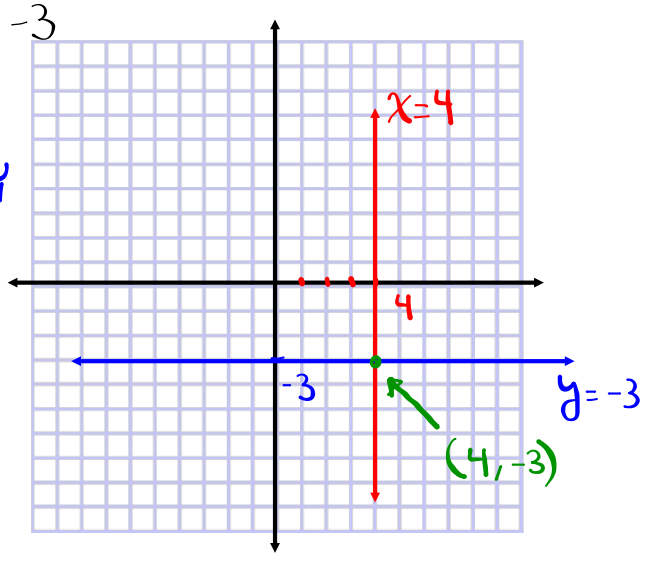
$3x+2y=-6$

$y=\frac{1}{2}x-4,\quad y-3=\frac{-3}{5}(x+2)$

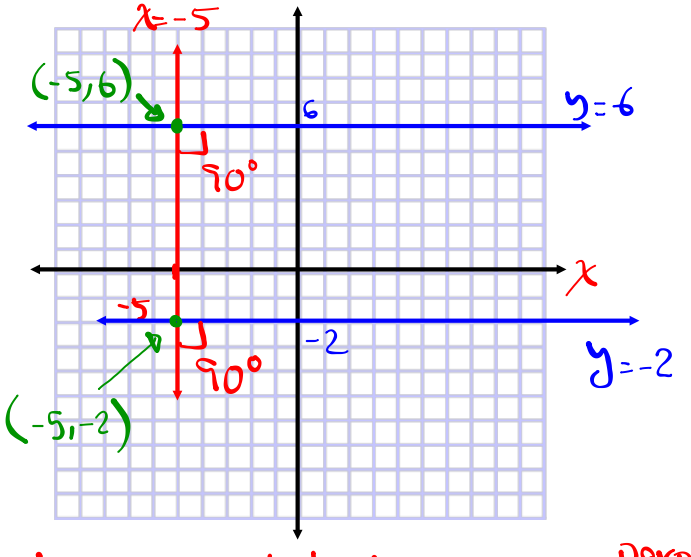
Draw $x=4$ & $y=-3$

x-only V.L.

y-only H.L.



Draw $x=-5$, $y=6$, and $y=-2$. Clearly mark any intersection Points. Clearly label all lines.



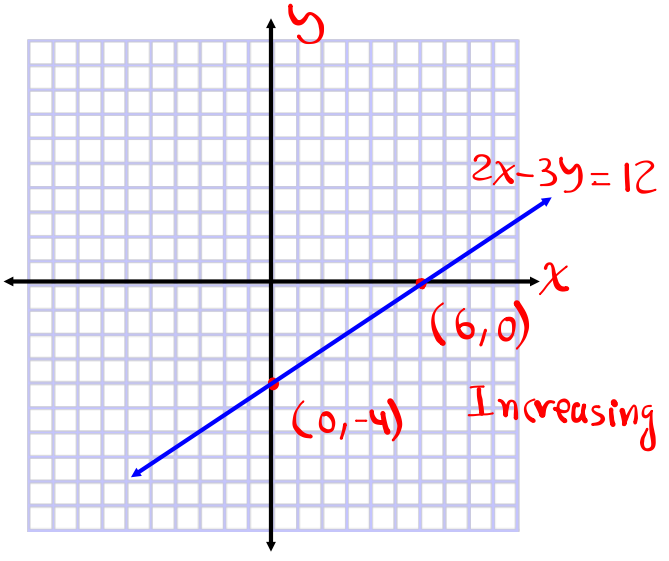
Vertical & Horizontal lines are perpendicular to each other.

Graphing $Ax + By = C$ by intercept method:

x	y
0	
	0

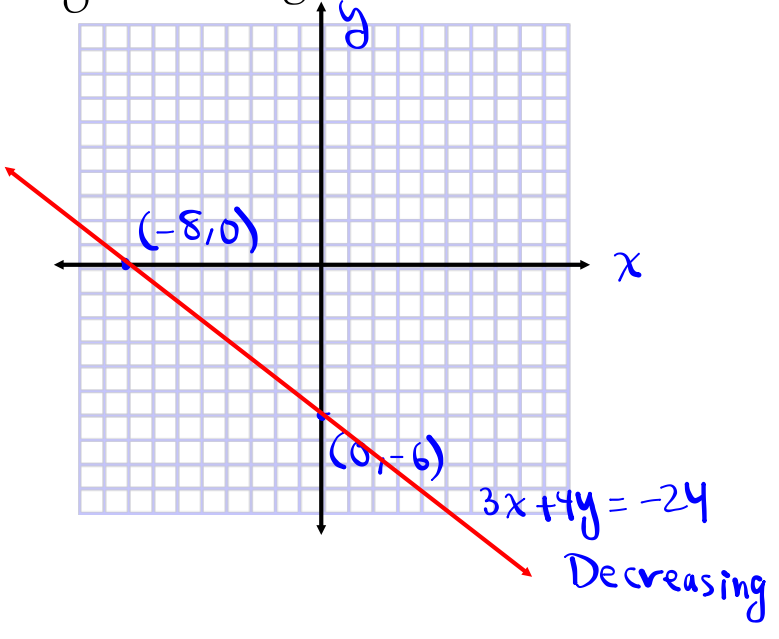
$2x - 3y = 12$

x	y
0	-4
6	0



Graph $3x + 4y = -24$ by intercept method.

x	y
0	-6
-8	0

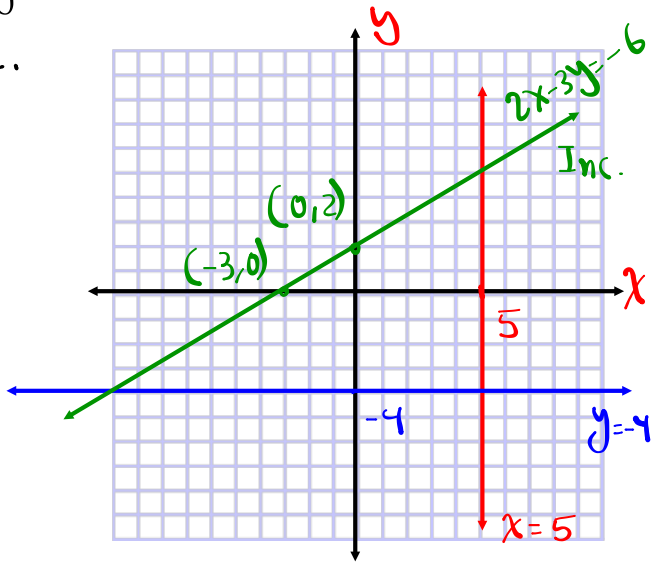


Graph $2x - 3y = -6$, $y = -4$, and $x = 5$ in the same rectangular coordinate system.

H.L. V.L.

Slant line

x	y
0	2
-3	0



Graphing $y = mx + b$ by two-Point method.

1) y has to be isolated.

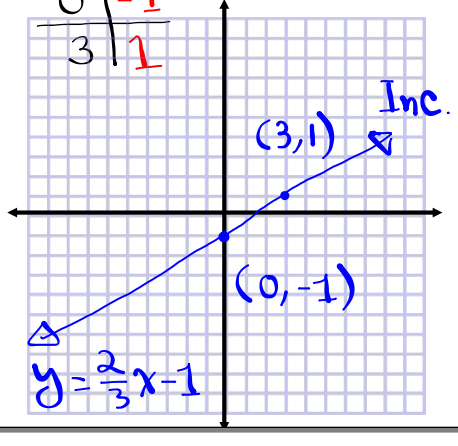
2) make a table,
Pick $x = 0$, and
x = Denominator of m.

x	y
0	

Denominator of m.

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

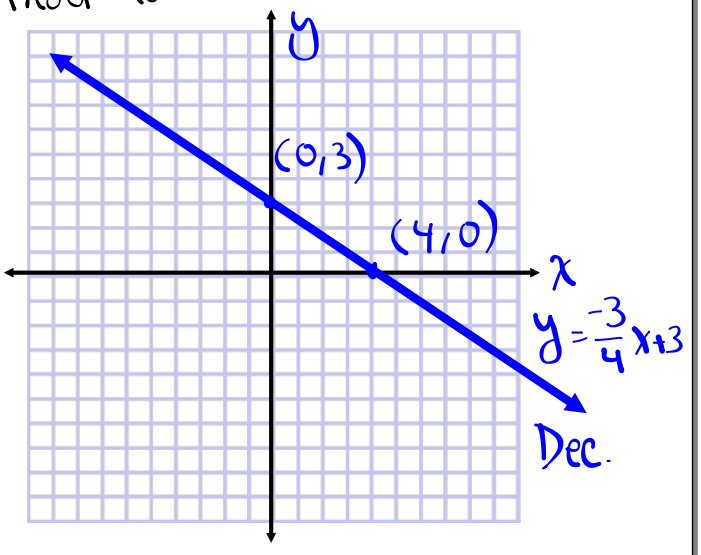
x	y
0	-1
3	1



Use 2-Point method to draw

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

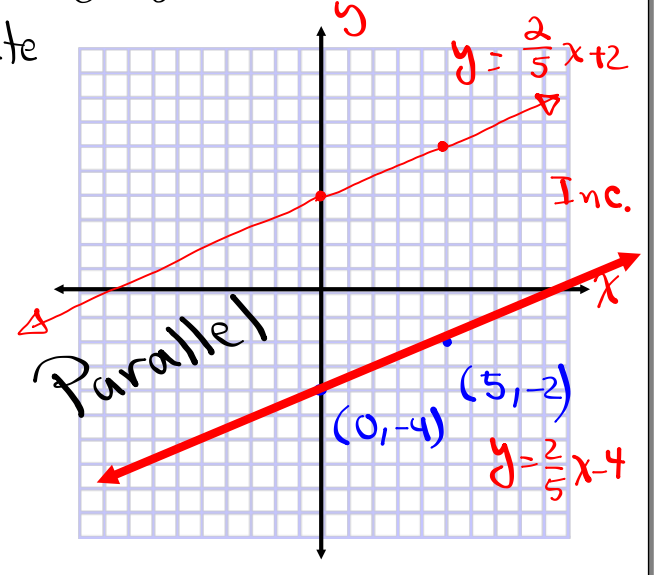
x	y
0	3
4	0



Graph $y = \frac{2}{5}x - 4$ & $y = \frac{2}{5}x + 4$ in the same rectangular Coordinate System.

x	y
0	-4
5	-2

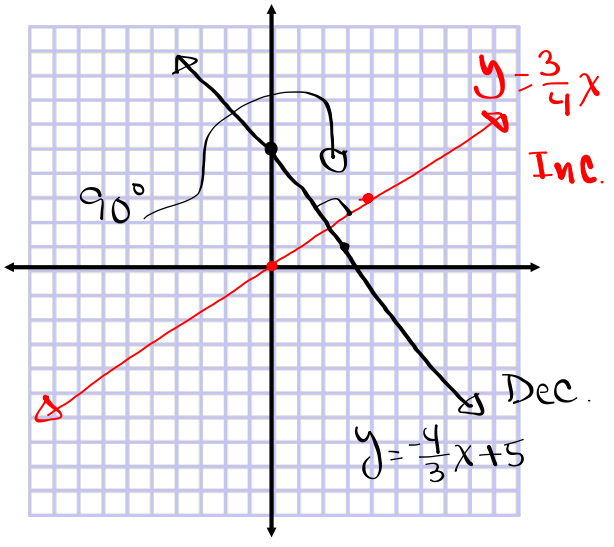
x	y
0	4
5	6



Graph $y = \frac{3}{4}x$ & $y = \frac{-4}{3}x + 5$.

x	y
0	0
4	3

x	y
0	5
3	1



lines are

Perpendicular.

How? Later

Distance between 2 points

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

ex: Find the distance between $(3, -2)$ & $(-5, 4)$.

$$d = \sqrt{(3 - -5)^2 + (-2 - 4)^2}$$

$$= \sqrt{(3+5)^2 + (-2-4)^2}$$

$$= \sqrt{8^2 + (-6)^2} = \sqrt{64 + 36} = \sqrt{100} = \boxed{10}$$

Find the distance from $(3,0)$ to $(0,4)$.

$$d=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$$

$$=\sqrt{(3-0)^2+(0-4)^2}=\sqrt{3^2+(-4)^2}$$

$$=\sqrt{9+16}=\sqrt{25}=\boxed{5}$$

Midpoint of line segment

$$M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

Find the midpoint of $\overline{AB}$ with

$A(-8,4)$ & $B(10,6)$

$$M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)=M\left(\frac{-8+10}{2},\frac{4+6}{2}\right)$$

$$=M\left(\frac{2}{2},\frac{10}{2}\right)$$

$$=M(1,5)$$