

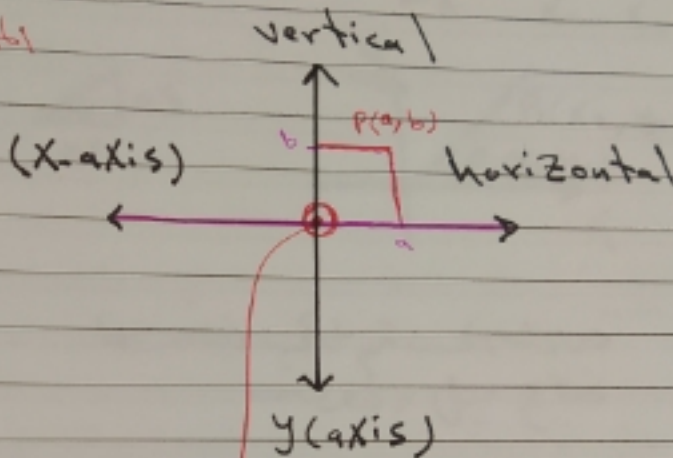
Lecture (1)

الموضوع :
 أساسيات

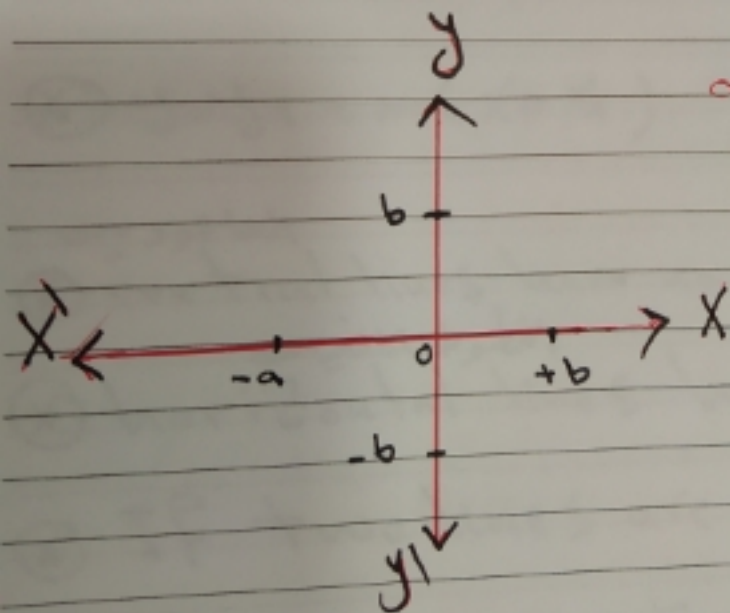
Chapter one

1.1 coordinates for the plane.

المحاور أو الإحداثيات



origin $(0,0)$



Ex) 3 Find the slope of the line

$$3x + 4y = 12.$$

Slope:

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

the slope is $m = -\frac{3}{4}$

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

Ex 4) Find the angle of inclination

of the line ~~given~~: $\sqrt{3}x + y = -3$

Sol) ~~$y = -\sqrt{3}x - 3$~~ $y = (-\sqrt{3})x - 3$

~~$y = -\sqrt{3}x - 3$~~ $m = -\sqrt{3}$

$$m = \tan \theta = -\sqrt{3}$$

$$\theta = 120^\circ$$

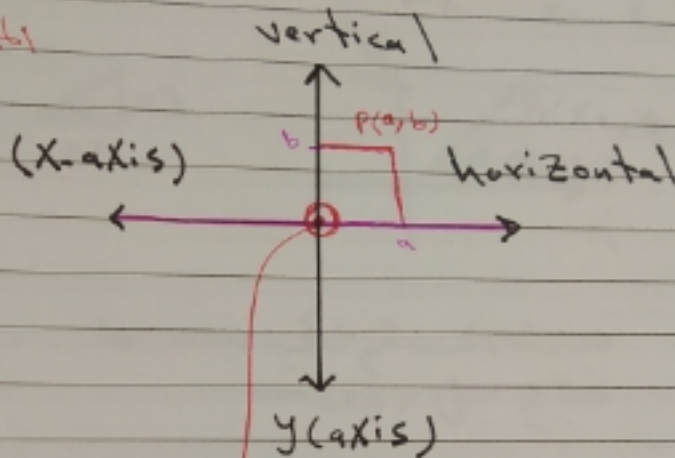
Lecture (1)

الموضوع : المحاور
طريقة التمثيل

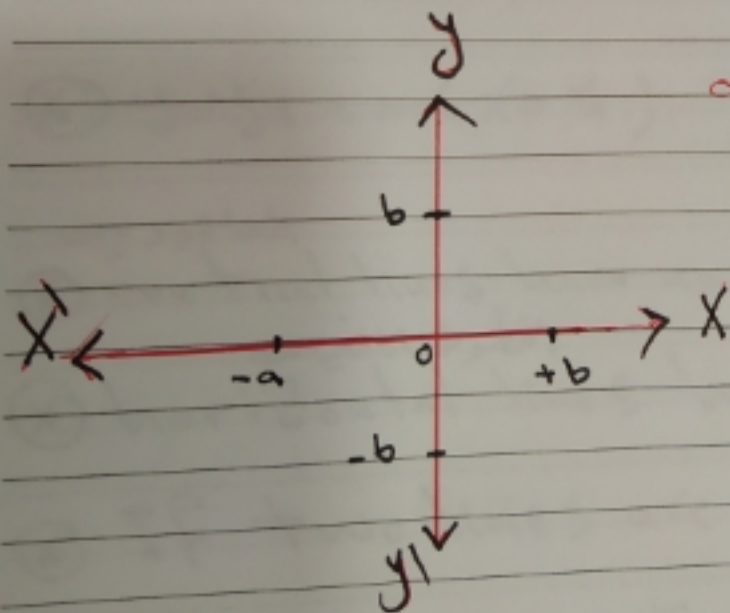
Chapter one

1.1 coordinates for the plane.

المحاور أو الإحداثيات



origin $P(0,0)$
 $(0,0)$



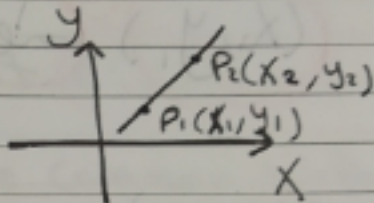
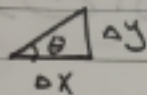
Equations of the lines:

① slope of a line

notes

* slope of the line $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

* $m = \tan \theta$



* $y = mx + b$ معادله الخط التي تتجه لها تحتاج ميل ونقطة

* $y - y_1 = m(x - x_1)$ Given (x_1, y_1) any point.

العمودي

* vertical lines have no slope $(x=0)$

النقطة الأفقي

$(y=0)$

* horizontal lines have zero slope.

متوازي

* If two lines are Parallel then $m_1 = m_2$

معاكسة

* If $m_1 \cdot m_2 = -1$ Perpendicular then

$$m_1 = -\frac{1}{m_2}$$

(3)

المسافة بين نقطتين

: Example

* Distance between two points

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

Ex 1) Find the slope of the line

determined by two point $A(2,1)$

and $B(-1,3)$ and find the common slope

of the line perpendicular to AB

ans

$$\textcircled{1} \text{ slope of } AB = m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{AB} = \frac{3 - 1}{-1 - 2} = -\frac{2}{3}$$

$$\textcircled{2} \text{ slope of perpendicular to } AB \text{ is } s = -\frac{1}{m_{AB}}$$

$$= \frac{3}{2}$$

2. Equation of a line.

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

لحصول على معادله الخط نحتاج الى معرفته

الميل (m) وكذلك الى نقطه (x_1, y_1)

ex 1) Write an equation for the line that passes through point

a) $P(-1, 3)$ with slope $m = -2$

b) $P_1(-2, 0)$ and $P_2(2, -2)$

Ans a) $y - y_1 = m(x - x_1)$
 $y - 3 = -2(x - (-1)) \rightarrow$

$$y + 2x = 1$$

b) $m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow m = \frac{-2 - 0}{2 - (-2)} \Rightarrow m = -\frac{1}{2}$

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

$$y - 0 = -\frac{1}{2}(x - (-2)) \Rightarrow 2y + x + 2 = 0$$

Ex 2) Find the equation of the line
 Passes through the points
 $P_1(4, 6)$ and $P_2(6, 10)$.

Ans) $m = \frac{\Delta y}{\Delta x} = \frac{10-6}{6-4} = 2$

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

$$(y - 6) = 2(x - 4); \quad y = 2x - 2$$

or

$$(y - 10) = 2(x - 6), \quad y = 2x - 2$$

x) $x = a$ vertical line

y) $y = b$ horizontal line

