

الأشكال الخطية
المعادلة
المعيارية

معامل x
 $\rightarrow 1$

$$y = ax + b \quad a, b \in \mathbb{R}$$

slope
الميل

Exp Consider this linear function

$$3x + 6y = 18$$

① Solve for y

$$-3x$$

$$\frac{6y}{6} = \frac{18 - 3x}{6}$$

$$y = \frac{18}{6} - \frac{3}{6}x$$

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

② Find slope

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

$$\text{slope} = m = a = -\frac{1}{2}$$

$$m = -\frac{1}{2} \text{ سالب}$$

الخط يميل زاوية منفرجة
مع محور x من الموجب



③ Find x -intercept

$$y = 0 \Rightarrow 3x + 6y = 18 \quad ? \quad x\text{-intercept}$$

$$\boxed{y=0} \Rightarrow \begin{aligned} 3x + 6y &= 18 \\ 3x + 0 &= 18 \\ 3x &= 18 \\ \boxed{x=6} \end{aligned}$$

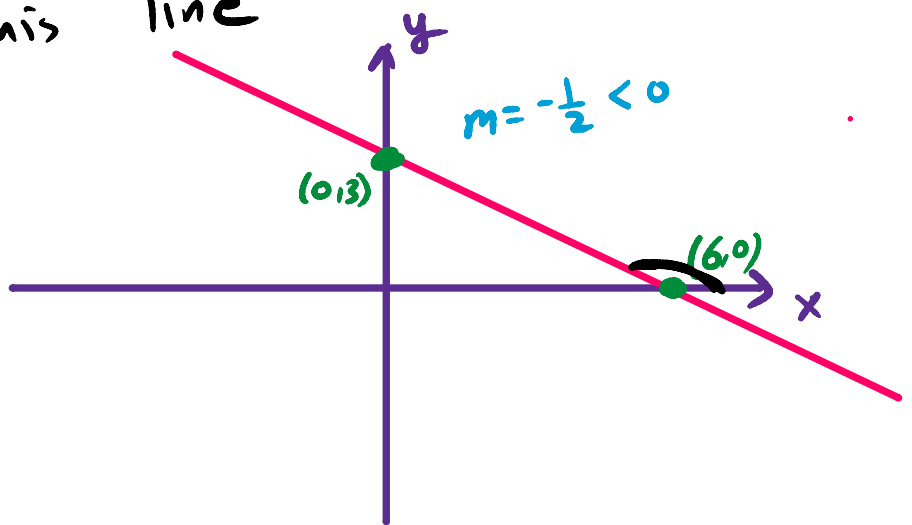
x -intercept
(6, 0)
نقطة تقاطع الخط مع
محور x

④ y -intercept

$$\boxed{x=0} \Rightarrow \begin{aligned} 3x + 6y &= 18 \\ 0 + 6y &= 18 \\ \boxed{y=3} \end{aligned}$$

y -intercept
(0, 3)
نقطة تقاطع الخط
مع محور y

⑤ sketch this line
 $3x + 6y = 18$



Exp

$$4x - 2y + 4 = 0$$

① Find slope

$-4x$ | ② x -intercept

① Find slope

$$-4x$$

$$-2y + \cancel{4} = -4x$$

$$\frac{-2y}{-2} = \frac{-4x - 4}{-2}$$

$$y = 2x + 2$$

⇒ slope
 $m = 2$

② x-intercept

$$y = 0 \Rightarrow 4x - 0 + 4 = 0$$

$$4x + \cancel{4} = 0$$

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

$$x = -1$$

x-intercept $(-1, 0)$

③ y-intercept

$$x = 0 \Rightarrow 4x - 2y + 4 = 0$$

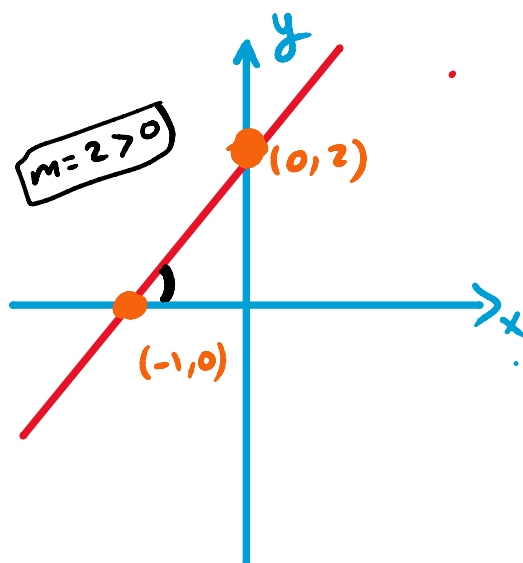
$$0 - 2y + \cancel{4} = 0$$

$$\frac{-2y}{-2} = \frac{-4}{-2}$$

$$y = 2$$

⇒ y-intercept
 $(0, 2)$

④ sketch this line



If $m > 0 \Rightarrow$ the line makes acute angle
x-axis & y-axis

If $m > 0 \Rightarrow$ the line makes an acute angle with the x-axis
 زاوية حادة مع محور x

if $m < 0 \Rightarrow$ the line makes an obtuse angle with the x-axis
 زاوية منفرجة مع محور x

Exp Consider this line $y - 3 = 0$
~~+3~~ ~~+3~~

① find slope.

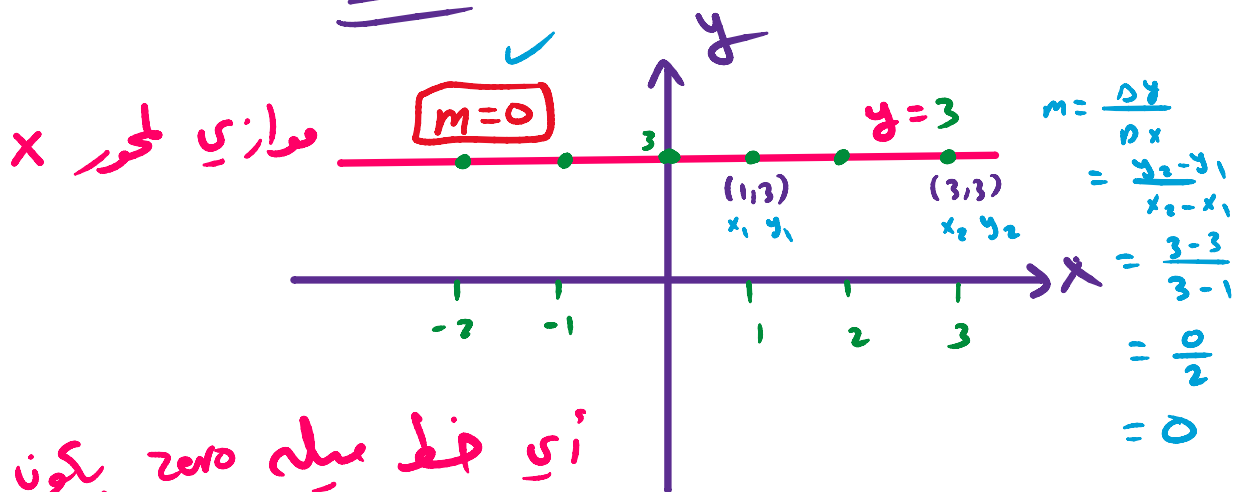
$y = 3$
 $\downarrow$
 b
 $y = 0x + 3$

معادلة $y = ax + b$

$\Rightarrow m = a = 0$

$\Rightarrow$ اقتران خطي (ثابت)
 Constant function

$y = 3$



أي خط ميله zero يكون موازي لمحور x

x-intercept لا يوجد

y-intercept $\Rightarrow (0, 3)$ ✓

$$y\text{-intercept} \Rightarrow (0, 3) \checkmark$$

Exp $x - 5 = 0$

① Find slope

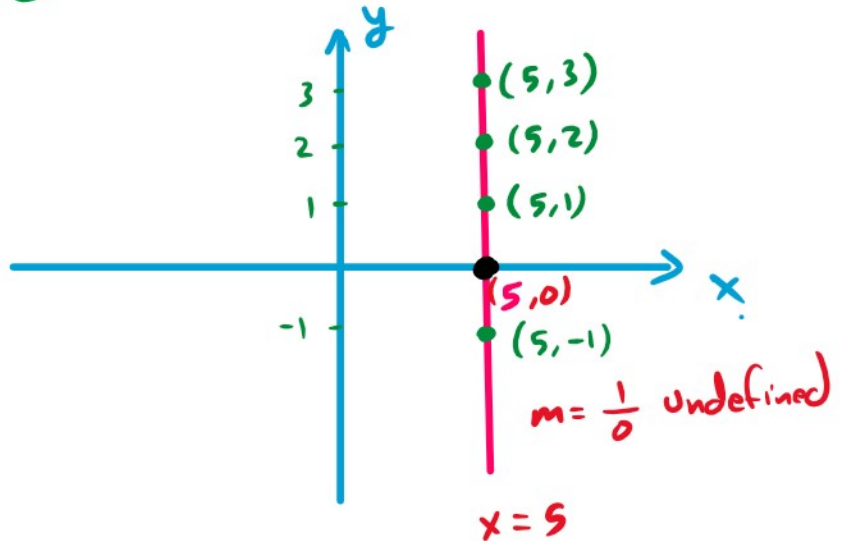
$$x = 5$$

موازي المحور y

معادلة $y = ax + b$

x-intercept $\Rightarrow (5, 0)$

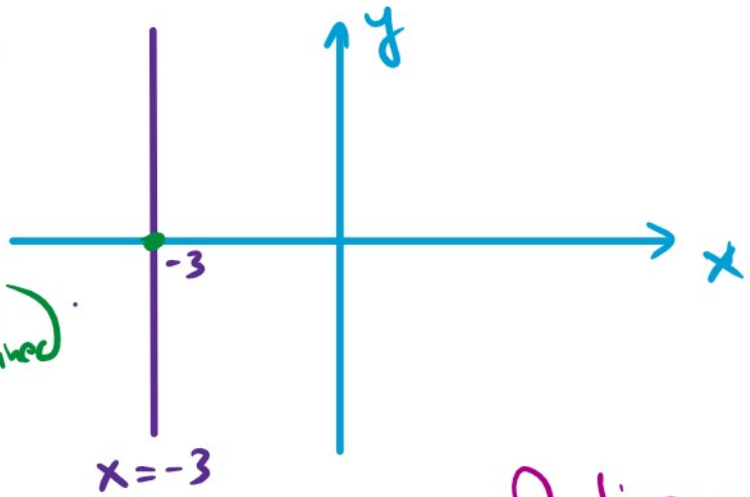
y-intercept $\Rightarrow$ لا يوجد



Ex sketch ① $x = -3$

slope = -3

slope = $\frac{1}{0}$ = undefined

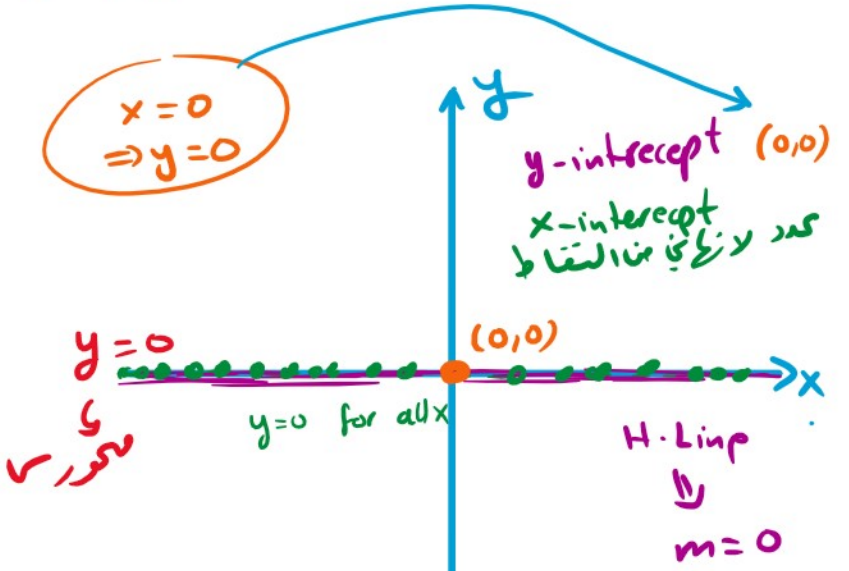


vertical line

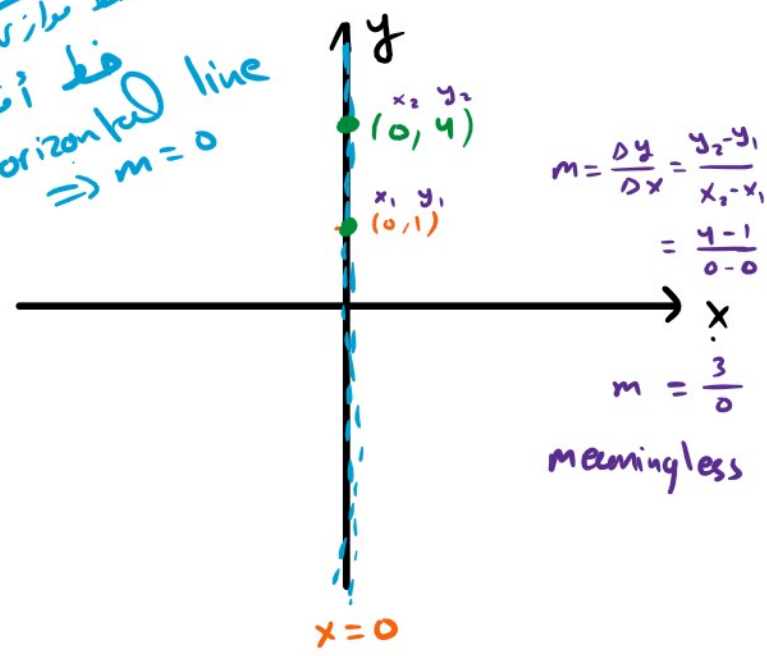
$x = -3$
 $x\text{-intercept} \Rightarrow (-3, 0)$
 $y\text{-intercept} \Rightarrow \text{لا يوجد}$
 Vertical line $\Rightarrow m$ undefined

② $y = 0$

~~نقطة لا يوجد~~
~~slope = 1~~



slope = 0
 خط موازي المحور
 خط أفقي
 Horizontal line
 $\Rightarrow m = 0$



③ $x = 0$

slope undefined
 $x\text{-intercept } (0, 0)$
 $y\text{-intercept}$
 عدد لا يوجد
 $y\text{-axis}$