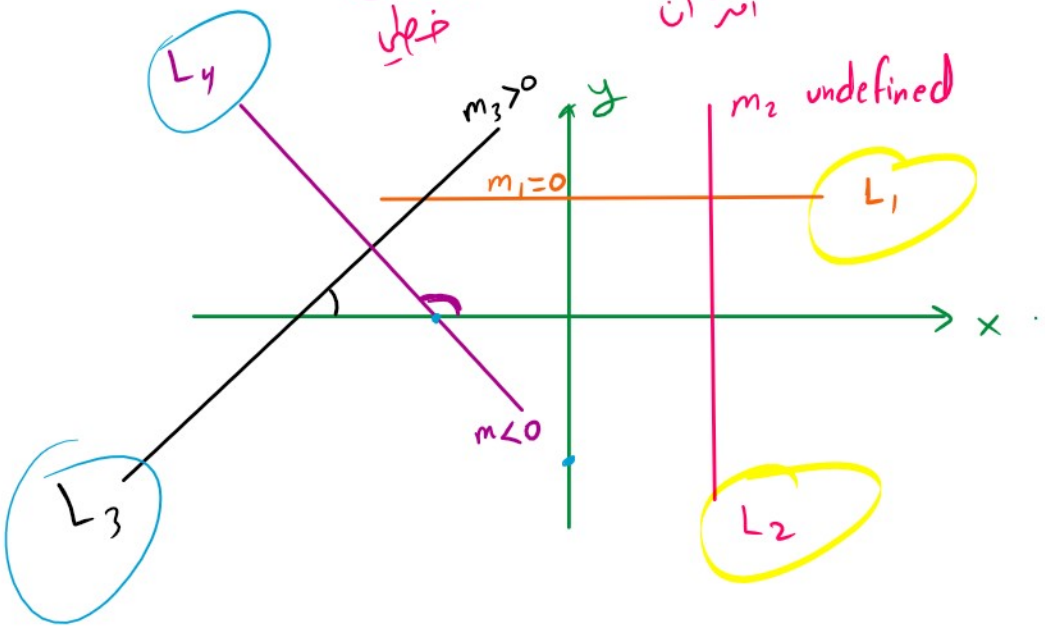
1.3 Part 1

Tuesday, November 23, 2021 9:55 AM

linear function

m: slope



Linear function $y = ax + b$, a, b constants

Exp Find intercepts for the line $y = ax + b$

x-intercept: $y=0$

y-intercept: $x=0$

x-intercept $\Rightarrow y=0 \Rightarrow 0 = ax + b$

$-b$

$\Rightarrow -\frac{b}{a} = \frac{a}{a}x$

$-\frac{b}{a} = x$

y-intercept $\Rightarrow x=0 \Rightarrow y = a(0)+b = 0+b = b$

Exp Given the linear function $y = ax + b$

m slope

موضوع القانون

Find slope

slope $= a$

Exp Find intercepts and slope and sketch the linear functions

??

① $12x + 3y = 24$

x-intercept $\Rightarrow y = 0 \Rightarrow 12x + 0 = 24 \Rightarrow \frac{12x}{12} = \frac{24}{12}$

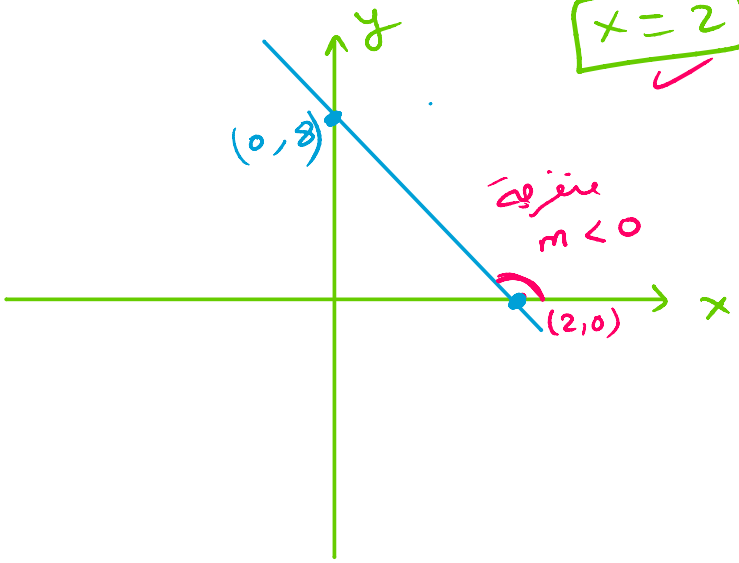
$x = 2$

y-intercept $\Rightarrow x = 0$

$0 + 3y = 24$

$\frac{3y}{3} = \frac{24}{3}$

$y = 8$



$12x + 3y = 24$

$-12x \quad -12x$

$3y = 24 - 12x$

$\frac{3y}{3} = \frac{24}{3} - \frac{12x}{3}$

$y = 24 - 4x$

$\Rightarrow m = -4$

$y = 8 - 4x$

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

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

$-4 \quad -4$

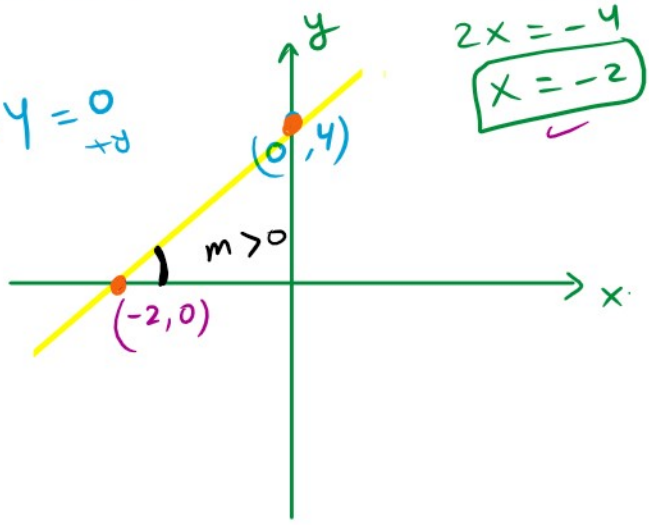
$2x = -4$

$x = -2$

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

$+0 \quad +y$

$\Rightarrow y = 4$



slope $y = \overset{m}{a}x + b$

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

$-2x$

$-y + 4 = -2x$

$-4 \quad -4$

$-y = -2x - 4$

$y = 2x + 4 \rightarrow m = 2 > 0$

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(3) $y - 5 = 0$

$\rightarrow [5 = 0]$

(3) $y - \cdots -$

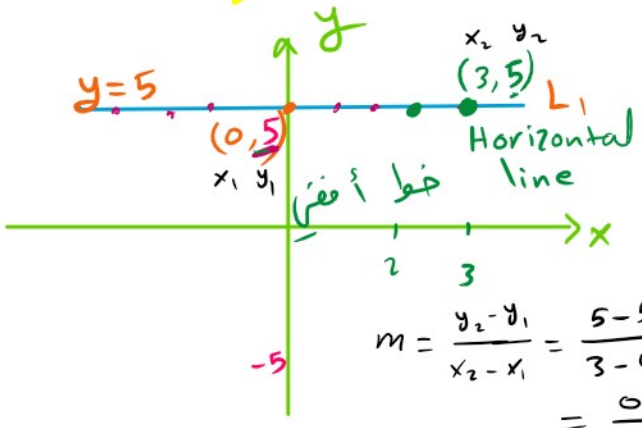
x-intercept $\Rightarrow y=0 \Rightarrow 0-5=0 \Rightarrow -5=0$

y-intercept $\Rightarrow x=0 \Rightarrow$

$y-5=0$

$+5 \quad +5$

$y=5$



$m = \frac{y_2-y_1}{x_2-x_1} = \frac{5-5}{3-0} = \frac{0}{3} = 0$

slope $y = ax+b \Rightarrow$ $y=5 \Rightarrow m=0, a=0$

Any H.L. (Horizontal line) has slope 0

(4) $x-4=3$

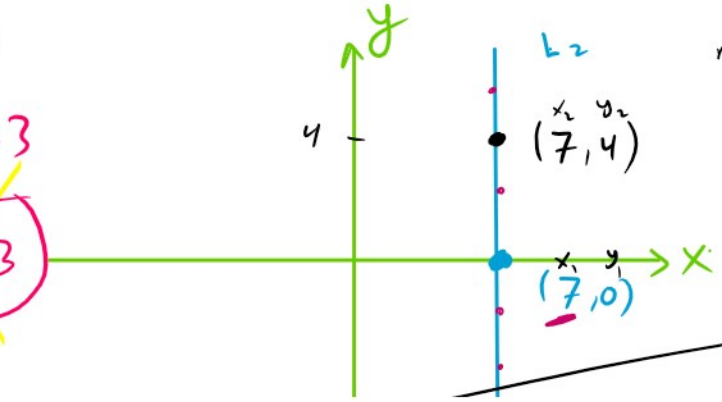
x-intercept $\Rightarrow y=0 \Rightarrow x-4=3 \Rightarrow x=7$

$+4 \quad +4$

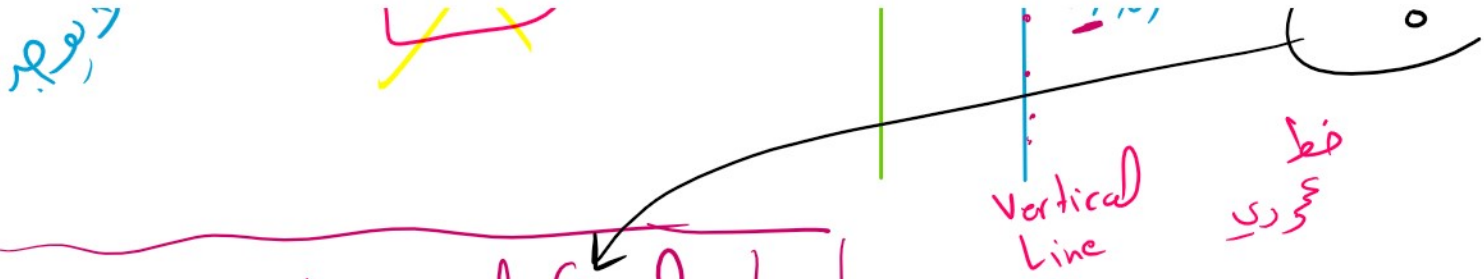
y-intercept $\Rightarrow x=0$

$\Rightarrow 0-4=3$

$\Rightarrow -4=3$



$m_2 = \frac{y_2-y_1}{x_2-x_1} = \frac{4-0}{7-7} = \frac{4}{0}$



Any V.L has undefined slope

خط عمودي (V.L)

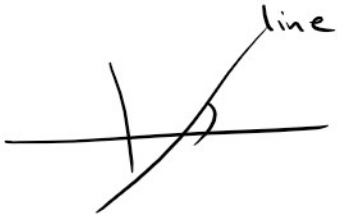
Def Slope of any line passes through two points (x_1, y_1) and (x_2, y_2) is

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

If $m = 0 \Rightarrow$ Line is Horizontal

$m =$ undefined $\Rightarrow$ Line is Vertical

$m > 0 \Rightarrow$



$m < 0 \Rightarrow$

Exp Find slope for the line passes through

Exp Find slope for the line passes

(1) $(\overset{x_1}{-2}, \overset{y_1}{-3}), (\overset{x_2}{0}, \overset{y_2}{-3})$

$$0 = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - -3}{0 - -2} = \frac{-3+3}{2} = \frac{0}{2} = 0$$

this line is horizontal

(2) $(\overset{x_1}{2}, \overset{y_1}{4}), (\overset{x_2}{2}, \overset{y_2}{-5})$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 4}{2 - 2} = \frac{-9}{0}$$ undefined

this line is Vertical

(3) $(\overset{x_1}{-1}, \overset{y_1}{2})$ and $(\overset{x_2}{5}, \overset{y_2}{4})$

$$m_1 = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{5 - -1} = \frac{2}{6} = \frac{1}{3} > 0$$

(4) $(\underset{x_1}{3}, \underset{y_1}{0})$ and $(\underset{x_2}{4}, \underset{y_2}{-3})$

$$m_2 = \frac{y_2 - y_1}{\quad} = \frac{-3 - 0}{\quad} = \frac{-3}{1} = -3$$

$$m_2 = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3-0}{4-3} = \frac{-3}{1} = -3$$

$$m_1 \cdot m_2 = \left(\frac{1}{3}\right)(-3) = \boxed{-1}$$

نتيجة

متعامدين
perpendicular
normal
or thogonal