

The y-intercept of the line $3x + 17 + y = 7 - 2x + 13y$ is

- A. 0
- B. $-\frac{7}{3}$
- C. $\frac{5}{6}$ ✓
- D. $\frac{5}{12}$

0 y intercept $x=0$
6 x intercept $y=0$

let $x=0$

$$17 + y = 7 + 13y$$

$$17 - 7 = 13y - y$$

$$10 = 12y$$

$$y = \frac{10}{12}$$

$$y = \frac{5}{6}$$

Describe the lines defined by the following equations. $y = mx + b$

- i) $3x + 4y = 0$ ii) $3x + 4 = 0$ iii) $4y = 0$ iv) $3x + 4y - 36 = 0$ v) $x - y = 0$

① $3x + 4y = 0 \rightarrow y = -\frac{3x}{4} = -\frac{3}{4}x + 0$
slope = $m = -\frac{3}{4}$ $b = 0$ y-intercept = 0

② $3x + 4 = 0$ $x = -\frac{4}{3}$ vertical line
y intercept x

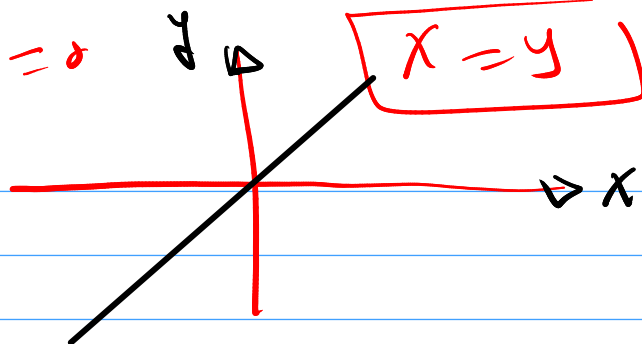
③ $4y = 0$ $y = \frac{0}{4}$ $y = 0$

④ $3x + 4y - 36 = 0$ (x axis) $\leftrightarrow$

$3x + 4y = 36$
 $4y = 36 - 3x \rightarrow y = \frac{36}{4} - \frac{3}{4}x$ $m = \text{slope} = -\frac{3}{4}$
 $k = \frac{36}{4} = 9$

⑤

$$x - y = 0$$



$$m = \text{slope} = 1$$

$$\underline{\underline{b = 0}}$$

Find the slope, and the x- and y-intercepts of the line whose equation is $10y = 2x - 7$.

$$10y = 2x - 7$$

$$y = \frac{2}{10}x - \frac{7}{10}$$

$$y = mx + b$$

$$\text{slope} = m = \frac{2}{10} = 0,2$$

$$\text{y intercept} \Rightarrow x = 0 \quad y = -\frac{7}{10} = -0,7$$

$$\text{x intercept} \quad y = 0$$

$$0 = \frac{2}{10}x - \frac{7}{10}$$

$$\frac{7}{10} = \left[\frac{2}{10} \right] x$$

$$x = \frac{7}{10} \cdot \frac{10}{2} = \boxed{\frac{7}{2}}$$

$$\text{x intercept} = \frac{7}{2}$$

$$\text{y intercept} = -0,7$$

$$\text{slope} = \frac{2}{10}$$

Find an equation of the line that has slope $\left(\frac{2}{7}\right)^m$ and passes through the points $A(7,1)$.

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

$$y = mx + b$$

$$(1) (y - y_1) = m(x - x_1)$$

$$(y - 1) = \frac{2}{7}(x - 7)$$

$$y - 1 = \frac{2}{7}x - \frac{2}{7} \times 7$$

$$y - 1 = \frac{2}{7}x - 2$$

$$y = \frac{2}{7}x - 1$$

$$y = mx + b$$

$$y = \frac{2}{7}x + b$$

$$(7, 1)$$

$$1 = \frac{2}{7}(7) + b$$

$$b = -1$$

$$y = \frac{2}{7}x - 1$$

If the points $(1,2)$ and $(2,1)$ are on the line $ax + by = 5$, then

A. $a = 0$ $\times$

B. $a < b$

C. $b < 0$

D. $a = b$ $\checkmark$

$$ax + by = 5$$

$$(-2) \times a + 2b = 5$$

$$2a + b = 5$$

$$-2a - 4b = -10$$

$$+3b = 5$$

$$b = \frac{5}{3}$$

$$b = \frac{5}{3}$$

$$a + 2\left(\frac{5}{3}\right) = 5$$

$$a + \frac{10}{3} = 5$$

$$a = 5 - \frac{10}{3} = \frac{15 - 10}{3}$$

$$a = \frac{5}{3}$$

A line $y = mx + b$ passes through the points $(\overset{x_1}{2}, \overset{y_1}{0})$ and $(\overset{x_2}{0}, \overset{y_2}{3})$. Find m and b .

$$y = mx + b$$

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

$$m = \frac{3 - 0}{0 - 2} = \boxed{-\frac{3}{2}}$$

$$y = -\frac{3}{2}x + b$$

$(0, 3)$

$$3 = 0 + b \quad \boxed{b = 3} \quad \begin{matrix} x = 0 \\ y = 3 \end{matrix}$$

$$\boxed{y = -\frac{3}{2}x + 3}$$

Find an equation of the line passing through the point $(1, 2)$ and intersecting the y -axis at $y = 3$.

$$y = mx + b$$

$$y\text{-intercept} = 3$$

$$\boxed{b = 3}$$

$\begin{matrix} x & y \\ (1, & 2) \end{matrix}$

$$y = mx + 3$$

$$2 = m(1) + 3$$

$$\leftarrow 2 = m + 3$$

$$m = 2 - 3 = \boxed{-1}$$

$$y = -1x + 3$$

$$y = -x + 3$$

* Find an equation of a line passing through the point $(1,2)$ with slope -1 .

$$y = mx + b$$

$$m = -1$$

$$y = -x + b$$

$$2 = -1(1) + b$$

$$2 = -1 + b$$

$$b = 2 + 1 = 3$$

$$y = -x + 3$$

Find the equation of a line passing through the point $(2,5)$ and perpendicular to the line passing through the points $(1,2)$ and $(6,5)$.

* L_1 $(2,5)$

$$m_1 = \frac{-1}{m_2} = \frac{-1}{3/5}$$

$$= \boxed{-\frac{5}{3}}$$

$$y = mx + b$$

$$y = -\frac{5}{3}x + b$$

$$5 = -\frac{5}{3}(2) + b$$

L_2 (red)

$$y = mx + b$$

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

$$y = \boxed{\frac{3}{5}}x + b$$

$$\text{slope} = m_2 = \frac{3}{5}$$

$$b = 5 + \frac{10}{3} = \frac{15 + 10}{3} = \boxed{\frac{25}{3}}$$

$$y = -\frac{5}{3} + \frac{25}{3}$$

Find an equation of the line that passes through the points $(\overset{x_2}{2}, \overset{y_2}{-3})$ and $(\overset{x_1}{2}, \overset{y_1}{-5})$.

$$y = mx + b$$

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

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - (-5)}{2 - 2} = \frac{-2}{0}$$

$$m = \infty \quad \text{vertical line}$$

$$\boxed{x = 2}$$

$$m = 0$$

horizontal line $(y = \bar{y})$

$$m = \frac{\infty}{0}$$

vertical line

$$(x = \bar{x}_1)$$