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# straight line graphs - 5

5.1

① a)  $(4, 3), (8, 6)$   
 $x_1 \ y_1 \quad x_2 \ y_2$

$$\frac{6-3}{8-4} = \frac{3}{4}$$

$$m = \frac{3}{4}$$

b)  $(5, 2), (7, -1)$   
 $x_1 \ y_1 \quad x_2 \ y_2$

$$\frac{-1-2}{7-5} = \frac{-3}{2}$$

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

c)  $(3p, -4p), (8p-2p)$   
 $x_1 \ y_1 \quad x_2 \ y_2$

$$\frac{-2p - (-4p)}{8p - 3p} = \frac{2p}{5p} = \frac{2}{5}$$

$$m = \frac{2}{5}$$

② a)  $m = \frac{1}{3}$  and  $(0, 7)$  is y-intercept

$$y = \frac{1}{3}x + 7$$

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b)  $(x3) \ y = \frac{1}{3}x + 7 \ (x3)$

$$3y = x + 21$$

$$x - 3y + 21 = 0$$

A B

③ ~~a)~~  $(1, 2), (4, 1)$   
 $x_1 \ y_1 \quad x_2 \ y_2$

$$\frac{1-2}{4-1} = -\frac{1}{3}$$

$$y = -\frac{1}{3}x + c$$

substitute  $(4, 1)$

$$1 = -\frac{1}{3}(4) + c$$

$$c = \frac{7}{3}$$

$$y = -\frac{1}{3}x + \frac{7}{3}$$

substitute  $(12, k)$

$$k = -\frac{1}{3}(12) + \frac{7}{3}$$

$$k = \underline{\underline{-\frac{5}{3}}}$$

$$\textcircled{4} \text{ a) } 4x - 5y + 12 = 0$$

$$\frac{5y}{5} = \frac{4x}{5} + \frac{12}{5}$$

$$y = \left(\frac{4}{5}\right)x + \frac{12}{5}$$

$$m = \frac{4}{5}$$

$$\text{b) } y = \frac{4}{5}x + \left(\frac{12}{5}\right) \rightarrow y\text{-intercept}$$

$$\left(0, \frac{12}{5}\right)$$

$$\text{c) } 0 = \frac{4}{5}x + \frac{12}{5}$$

$$\left(\div \frac{4}{5}\right) - \frac{12}{5} = \frac{4}{5}x \left(\div \frac{4}{5}\right)$$

$$x = -3$$

$$\left(-3, 0\right)$$

$$\textcircled{5} \quad (2, 3a), (5a, -2)$$

$$x_1 \quad y_1 \quad x_2 \quad y_2$$

$$x_1(y_2 - y_1) - y_1(x_2 - x_1) = -1 \cdot x_1(y_2 - y_1)$$

$$-2 - 3a = -5a + 2$$

$$-3a + 5a = 2 + 2$$

$$\frac{2a}{2} = \frac{4}{2}$$

$$a = 2$$

$$\textcircled{6} \quad L_1: y = -\frac{1}{5}x + 3$$

$$L_2: 3x - 4y + 7 = 0$$

$$\frac{4y}{4} = \frac{3x}{4} + \frac{7}{4}$$

$$y = \frac{3}{4}x + \frac{7}{4}$$

$$\frac{3}{4}x + \frac{7}{4} = -\frac{1}{5}x + 3$$

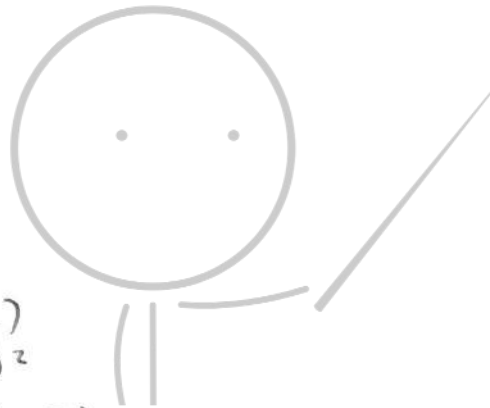
$$\frac{3}{4}x + \frac{1}{5}x = -\frac{7}{4} + 3 = \left(\frac{25}{19}, \frac{52}{19}\right)$$

$$x = \frac{25}{19}$$

substitute x into in either  
L1 or L2

$$y = -\frac{1}{5}\left(\frac{25}{19}\right) + 3$$

$$y = \frac{52}{19}$$



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$$\textcircled{7} \text{ a) } \begin{matrix} A & & B \\ (-3P-3, 2P) & , & (-5P+1, 0) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

$$\frac{0-2P}{(-5P+1)-(-3P-3)} = \frac{-2P}{-2P+4}$$

slope between A and B

$$= \frac{-2P}{-2P+4}$$

$$\begin{matrix} B & & C \\ (-5P+1, 0) & & (0, 8P) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

$$\frac{8P-0}{0-(-5P+1)} = \frac{8P}{5P-1} \rightarrow \text{slope between B and C}$$

$$\frac{-2P}{-2P+4} = \frac{8P}{5P-1}$$

$$(-2P)(5P-1) = (8P)(-2P+4)$$

$$-10P^2 + 2P = -16P^2 + 32P$$

$$-10P^2 + 2P + 16P^2 - 32P = 0$$

$$6P^2 - 30P = 0$$

$$6P(P-5) = 0$$

$$P = 5$$

**BF MATHS**

$$\text{b) } B: (-5(5)+1, 0) = (-24, 0)$$

$$C: (0, 8(5)) = (0, 40)$$

$$\frac{40-0}{0-(-24)} = \frac{40}{24} = \frac{5}{3}$$

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

$$\textcircled{8} \text{ a) } y = \frac{2}{3}x - 4 \quad (\times 3)$$

$$3y = \frac{2}{1}x - 12$$

$$0 = 2x - 3y - 12$$

⑧ b) substitute  $(P, -2)$

$$y = \frac{2}{3}x - 4$$

$$-2 = \frac{2}{3}P - 4$$

$$-2 + 4 = \frac{2}{3}P$$

$$\left(\div \frac{2}{3}\right) 2 = \frac{2}{3}P \left(\div \frac{2}{3}\right)$$

$$\underline{\underline{P = 3}}$$

c)  $\frac{ky}{k} = \frac{3}{k}x + \frac{25}{k}$

$$y = \frac{3}{k}x + \frac{25}{k}$$

$(3, -2)$   $-2 = \frac{3}{k}(3) + \frac{25}{k}$

$$-2 = \frac{9}{k} + \frac{25}{k}$$

$$-2 = \frac{34}{k}$$

$$\underline{\underline{k = -17}}$$

⑨ a)  $(-2, k+1)$  and  $(3k-2, 6)$   
 $x_1, y_1$                        $x_2, y_2$

$$\frac{6 - (k+1)}{(3k-2) - (-2)} = \frac{5-k}{3k}$$

$$\frac{5-k}{3k} = -\frac{1}{2}$$

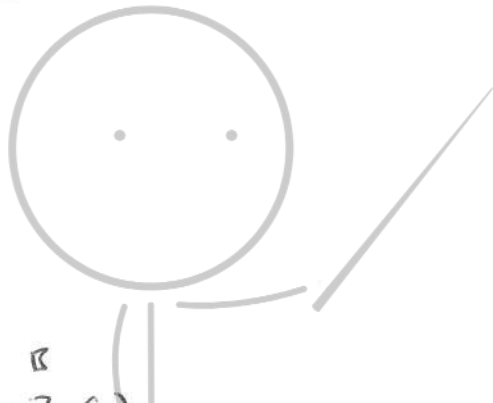
$$5-k = -\frac{1}{2}(3k)$$

$$5-k = -\frac{3}{2}k$$

$$5 = -\frac{3}{2}k + k$$

$$\left(\div -\frac{1}{2}\right) 5 = -\frac{1}{2}k \left(\div -\frac{1}{2}\right)$$

$$\underline{\underline{k = -10}}$$



BF MATHS

$$\textcircled{9} \text{ b) } y = -\frac{1}{2}x + c$$

$$A: (-2, k+1) = (-2, -9)$$

Substitute  $(-2, -9)$

$$-9 = -\frac{1}{2}(-2) + c$$

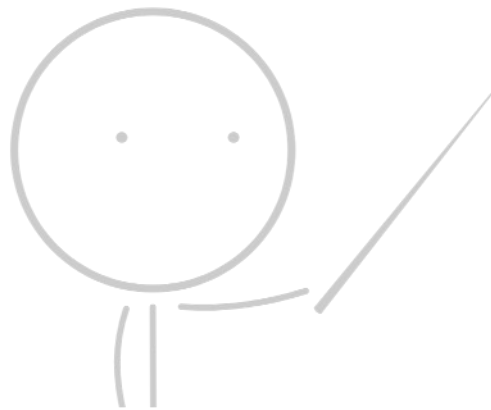
$$-9 = 1 + c$$

$$c = -10$$

$$\text{c) } y = -\frac{1}{2}x - 10$$

$$2y = -x - 20$$

$$x + 2y + 20 = 0$$



**BF MATHS**