

Coordinate Geometry Straight Line Graphs - Answers

Exercise A

①

$$(a) \quad m = \frac{3-2}{6-4}$$

$$m = \frac{1}{2} //$$

(b)

$$m = \frac{4-3}{5-1}$$

$$= \frac{1}{4} //$$

(c)

$$m = \frac{5-2}{-4-1}$$

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

(d)

$$m = \frac{5-3}{6-2}$$

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

$$= \frac{1}{2}$$

(e)

$$m = \frac{-6-4}{7-3}$$

$$m = -1$$

(f)

$$m = \frac{8-3}{-2-12}$$

$$= \frac{5}{-14}$$

$$= -\frac{5}{14}$$

②

$$\frac{a-5}{6-3} = 4$$

$$\frac{a+5}{3} = 4$$

$$a+5=12$$

$$\underline{\underline{a=7}}$$

③

$$\frac{b-3}{5-8} = -3$$

$$b-3=9$$

$$\underline{\underline{b=12}}$$

④

$$\frac{6-4}{7-c} = \frac{3}{4}$$

$$\frac{2}{7-c} = \frac{3}{4}$$

$$8 = 3(7-c)$$

$$8 = 21 - 3c$$

$$3c = 13$$

$$c = \underline{\underline{\frac{13}{3}}}$$

Exercise B

①

(a) $m = -1, c = 4$

(b) $m = 2, c = -5$

(c) $m = \frac{1}{2}, c = -\frac{2}{3}$

(d) $m = -3, c = 0$

(e) $m = \frac{6}{7}, c = \frac{7}{5}$

(f) $m = -7, c = 2$

(g) $3x - 4y + 8 = 0$

$$3x + 8 = 4y$$

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

$$m = \frac{3}{4}, c = 2$$

(h) $4x - 5y - 10 = 0$

$$4x - 10 = 5y$$

$$y = \frac{4}{5}x - 2$$

$$m = \frac{4}{5}, c = -2$$

(i) $-2x + y - 9 = 0$

$$y = 2x + 9$$

$$m = 2, c = 9$$

(j) $7x + 4y + 12 = 0$

$$4y = -7x - 12$$

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

$$m = -\frac{7}{4}, c = -3$$

(k) $7x - 2y + 3 = 0$

$$2y = 7x + 3$$

$$y = \frac{7}{2}x + \frac{3}{2}$$

$$m = \frac{7}{2}, c = \frac{3}{2}$$

(l) $-5x + 4y + 2 = 0$

$$4y = 5x - 2$$

$$y = \frac{5}{4}x - \frac{1}{2}$$

$$m = \frac{5}{4}, c = -\frac{1}{2}$$

②

(a) $y = 4x + 3$

$$4x - y + 3 = 0$$

(b) $y = 3x - 2$

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

(c) $y = -6x + 7$

$$6x + y - 7 = 0$$

(e) $y = \frac{4}{5}x - 6$

Usually when they ask you to write it in the form

$ax + by + c = 0$, they clearly say that

they want a, b and c to be integers.

Let us assume that in these questions.

$$y = \frac{5}{3}x + 2$$

(x 3)

$$3y = 5x + 6$$

$$5x - 3y + 6 = 0$$

$$6y = -2x + 3$$

$$2x + 6y - 3 = 0$$

$$(k) \quad y = \frac{2}{3}x + \frac{5}{6}$$

$$6y = 4x + 5$$

$$4x - 6y + 5 = 0$$

$$(f) \quad y = \frac{7}{3}x$$

$$3y = 7x$$

$$7x - 3y = 0$$

$$(l) \quad y = \frac{3}{5}x + \frac{1}{2}$$

(x 10)

$$10y = 6x + 5$$

$$6x - 10y + 5 = 0$$

$$(g) \quad y = 2x - \frac{4}{7}$$

$$7y = 14x - 4$$

$$14x - 7y - 4 = 0$$

$$(h) \quad y = -3x + \frac{7}{9}$$

$$9y = -27x + 7$$

$$27x + 9y - 7 = 0$$

$$(i) \quad y = -6x - \frac{2}{3}$$

$$3y = -18x - 2$$

$$18x + 3y + 2 = 0$$

$$(j) \quad y = -\frac{1}{3}x + \frac{1}{2}$$

(x 6)

3

Though this question is ^{very} easy, I sketch a small diagram to make it much more easier to understand. When it comes to complicated questions, I strongly recommend students to sketch a diagram

(P.T.O.)

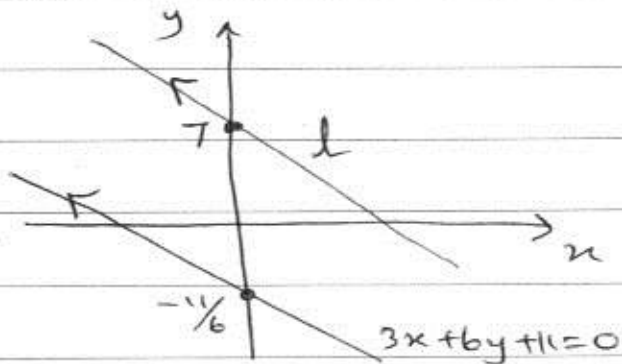
$$3x + by + 11 = 0$$

$$6y = -3x - 11$$

$$y = -\frac{1}{2}x - \frac{11}{6}$$

$$m = -\frac{1}{2}, c = -\frac{11}{6}$$

Finding m & c make it easier to sketch the line.



Gradient of line l :

$$m = -\frac{1}{2}$$

y -intercept = 7

\therefore Equation of l :

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

Coordinates of R :

Sub $y=0$ into

$$3x + 2y - 5 = 0$$

$$3x - 5 = 0$$

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

$$\therefore R \rightarrow \left(\frac{5}{3}, 0\right)$$

5

$$5x - 4y + 20 = 0$$

$$4y = 5x + 20$$

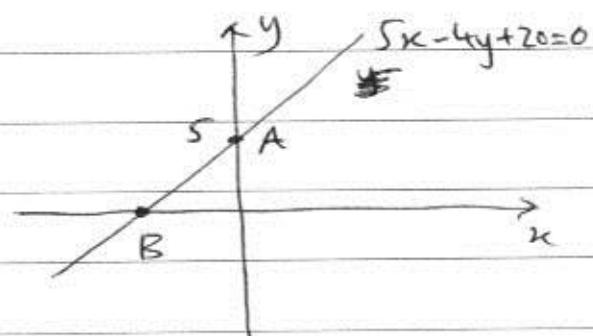
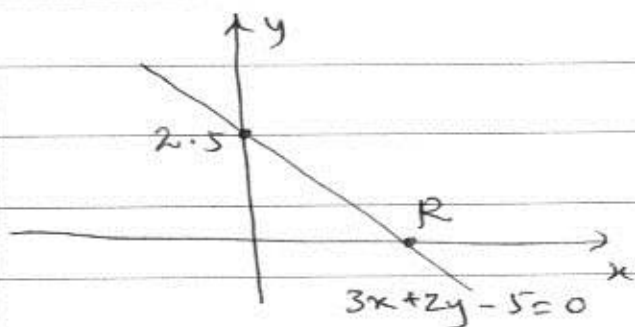
$$y = \frac{5}{4}x + 5$$

In these questions I am changing the equation to $y = mx + c$ in order to make it easier to sketch. If you understand the question very well without a sketch, you do not need to change the equation into $y = mx + c$ form.

4 $3x + 2y - 5 = 0$

$$2y = -3x + 5$$

$$y = -1.5x + 2.5$$



Coordinates of B:

sub $y=0$ into

$$5x - 4y + 20 = 0$$

$$5x + 20 = 0$$

$$x = -4$$

$$\therefore B \rightarrow (-4, 0)$$

$$A \rightarrow (0, 5)$$

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

$$y - -3 = -4(x - -2)$$

$$y + 3 = -4x - 8$$

$$\underline{\underline{y = -4x - 11}}$$

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

$$y - 10 = \frac{1}{2}(x - -4)$$

$$2y - 20 = x + 4$$

$$\underline{\underline{x - 2y + 24 = 0}}$$

Exercise C

①

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

$$y - 5 = 2(x - 2)$$

$$y - 5 = 2x - 4$$

$$\underline{\underline{y = 2x + 1}}$$

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

$$y - -1 = \frac{-2}{3}(x - -6)$$

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

$$\underline{\underline{2x + 3y + 15 = 0}}$$

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

$$y - 1 = 3(x - -2)$$

$$y - 1 = 3x + 6$$

$$\underline{\underline{y = 3x + 7}}$$

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

$$y - 2a = 2(x - a)$$

$$y - 2a = 2x - 2a$$

$$\underline{\underline{y = 2x}}$$

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

$$y - -b = -1(x - 3)$$

$$y + b = -x + 3$$

$$\underline{\underline{y = -x - 3}}$$

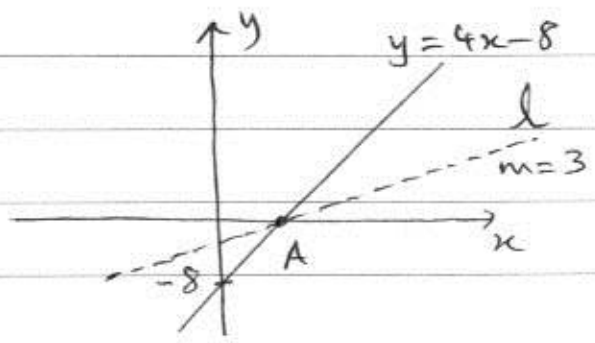
$$(h) y - y_1 = m(x - x_1)$$

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

$$2y - 6b = -x - 2b$$

$$\underline{\underline{x + 2y - 4b = 0}}$$

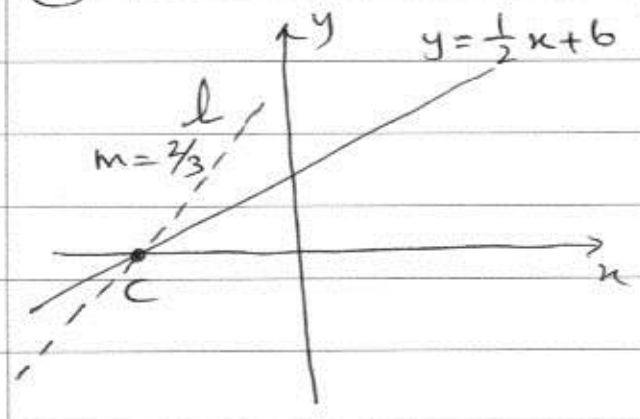
2



Coordinates of A:
 sub $y=0$ into,
 $y = 4x - 8$
 $0 = 4x - 8$
 $x = 2$
 $A \rightarrow (2, 0)$

Equation of l :
 $m = 3, (2, 0)$
 $y - y_1 = m(x - x_1)$
 $y - 0 = 3(x - 2)$
 $y = 3x - 6$

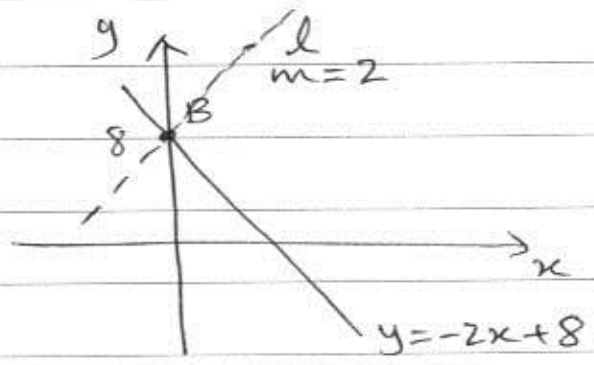
4



Coordinates of C:
 sub $y=0$ into,
 $y = \frac{1}{2}x + 6$
 $0 = \frac{1}{2}x + 6$
 $x = -12$
 $C \rightarrow (-12, 0)$

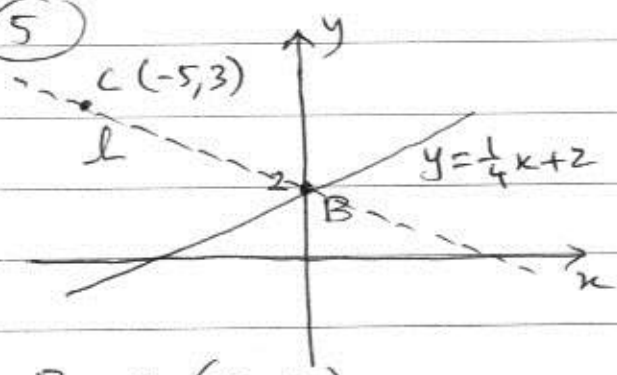
Equation of l :
 $m = \frac{2}{3}, (-12, 0)$
 $y - y_1 = m(x - x_1)$
 $y - 0 = \frac{2}{3}(x - (-12))$
 $3y = 2x + 24$
 $2x - 3y + 24 = 0$

3



$B \rightarrow (0, 8)$
 Equation of l :
 $m = 2, c = 8$
 $y = 2x + 8$

5



$B \rightarrow (0, 2)$
 $C \rightarrow (-5, 3)$

Gradient of l :

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

$$m = \frac{3 - 2}{-5 - 0}$$

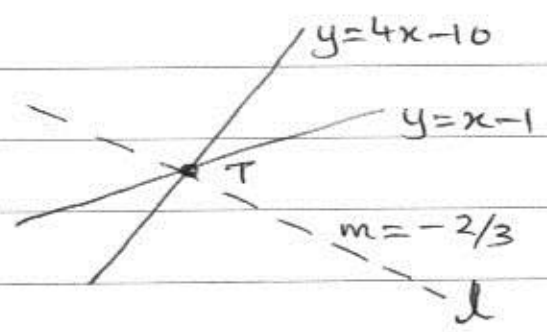
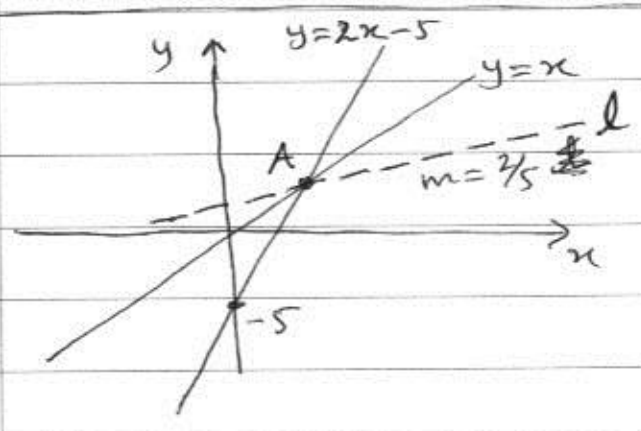
$$m = -\frac{1}{5}$$

(7)

You don't always
to sketch the
 x and y axes.

Sometime a sketch
without the axes
would be sufficient
to understand the
question.

(6)



Coordinates of A :

$y = x$ } solve
 $y = 2x - 5$ } simultaneously.

$$2x - 5 = x$$

$$x = 5$$

Sub $x = 5$ into $y = x$.

$$y = 5$$

$\therefore A \rightarrow (5, 5)$

Equation of line l :

$$m = \frac{2}{5}, (5, 5)$$

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

$$y - 5 = \frac{2}{5}(x - 5)$$

$$5y - 25 = 2x - 10$$

$$2x - 5y + 15 = 0$$

Coordinates of T :

$y = 4x - 10$ } solve
 $y = x - 1$ } simultaneously

$$4x - 10 = x - 1$$

$$3x = 9$$

$$x = 3$$

sub $x = 3$ into $y = x - 1$

$$y = 3 - 1 = 2$$

$T \rightarrow (3, 2)$

Equation of line l :

$$m = -\frac{2}{3}, (3, 2)$$

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

$$y - 2 = -\frac{2}{3}(x - 3)$$

$$y - 2 = \frac{-2}{3}(x - 3)$$

$$3y - 6 = -2x + 6$$

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

Equation of line p:

$$m = \frac{2}{3}, (6, -12)$$

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

$$y - -12 = \frac{2}{3}(x - 6)$$

$$3y + 36 = 2x - 12$$

$$3y = 2x - 48$$

$$y = \frac{2}{3}x - 16$$

$$\therefore A \rightarrow (0, -16)$$

Equation of q:

$$m = -1, (5, 5)$$

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

$$y - 5 = -1(x - 5)$$

$$y - 5 = -x + 5$$

$$y = -x + 10$$

For coordinates of B:

$$\text{Sub } y = 0$$

$$-x + 10 = 0$$

$$x = 10$$

$$\therefore B \rightarrow (10, 0)$$

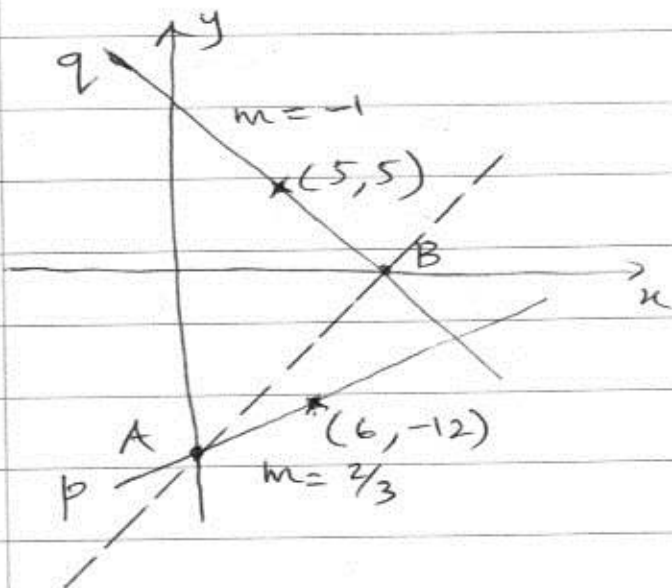
Gradient of line AB:

$$M_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{0 - -16}{10 - 0}$$

$$= \underline{\underline{1.6}}$$

8 In this question, they are giving information about where the lines meet the x and y axes. Hence, if you are to sketch a diagram, you should sketch the x & y axes as well.



There are faster ways to find the coordinates of A and B. However,

I will focus on an easier to understand method.