



MATHEMATICS  
ADVANCED  
YEAR 9

Coordinate Geometry

Time Allowed: 50 minutes

Examiner: Ms Opferkuch

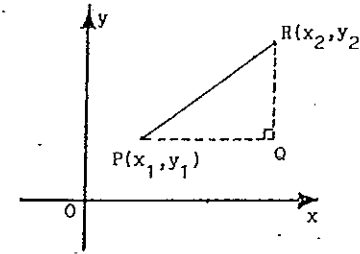
Instructions: Attempt ALL Questions

All necessary working should be shown in every question.  
Marks may be deducted for careless or badly arranged work.

The marks for each question are indicated at the start of the question.

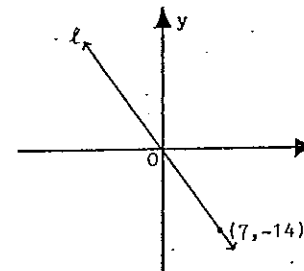
Name: \_\_\_\_\_

QUESTION 1



- (a) The length  $PQ$  is:
- (A)  $x_2 - x_1$     (B)  $x_2 + x_1$     (C)  $y_2 - y_1$     (D)  $y_2 + y_1$

- (b) The equation of the line  $l$  is:



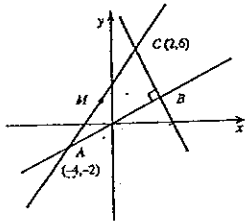
- (A)  $y = \frac{1}{2}x$     (B)  $y = -\frac{1}{2}x$     (C)  $y = 2x$     (D)  $y = -2x$
- (c) The equation of the line passing through the origin, perpendicular to the line  $y = \frac{2}{3}x$  is:
- (A)  $y = \frac{2}{3}x$     (B)  $y = -\frac{2}{3}x$     (C)  $y = \frac{3}{2}x$     (D)  $y = -\frac{3}{2}x$

### QUESTION 2

The points  $A(-3, 2)$  and  $B(5, 8)$  lie on a number plane.

- Find the gradient of  $AB$ .
- Find the equation of  $AB$  in general form.
- Find the midpoint of  $AB$ .
- Find the length of  $AB$ .

### QUESTION 3



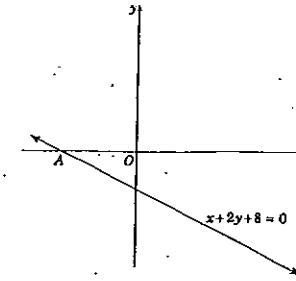
- Find the equation of the line  $AB$ , given that it passes through the origin.
- The line  $BC$  is perpendicular to  $AB$ . Show that its equation is  $y = -2x + 10$ .
- By solving the equations in (a) and (b), find the coordinates of  $B$ .

### QUESTION 4

Plot the points  $A(-4, 7)$ ,  $B(3, 4)$ ,  $C(-2, -3)$ . the point  $D$  is the fourth vertex of a parallelogram  $CABD$ .

- Find the coordinates of  $D$ .
- Find the midpoint of  $AC$ .
- Show that the diagonals of the parallelogram  $CABD$  bisect one another.
- A line is drawn through  $(-2, -3)$  perpendicular to  $AB$ . Find the equation of this line.

### QUESTION 5



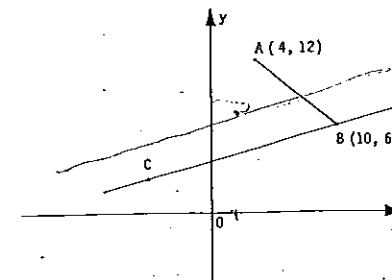
The line  $l$  is shown in the diagram. It has equation  $x + 2y + 8 = 0$  and cuts the  $x$ -axis at  $A$ .

The line  $k$  has equation  $y = -\frac{1}{2}x + 6$ , and is not shown on the diagram.

Copy or trace the diagram into your Writing Booklet.

- Find the coordinates of  $A$ .
- Explain why  $k$  is parallel to  $l$ .
- Draw the graph of  $k$  on your diagram, indicating where it cuts the axes.
- Shade the region  $x + 2y + 8 \leq 0$  on your diagram.

### QUESTION 6



- The equation of the line  $BC$  is  $3y = x + 8$ . Find the equation of the line  $l$  which passes through the point  $D(1, 7)$  parallel to  $BC$ .
- Show that the line  $l$  passes through the midpoint of  $AB$ .

Good effort!  
Check corrections!

1A ✓ 2 gradient of AB =  $-\frac{6}{8} = -\frac{3}{4}$  ✓

(b) D ✓ b)  $y = mx + b$   $y = \frac{3}{4}x + 4\frac{1}{4}$

(c) B ✓  $8 = (5 \times \frac{3}{4}) + b$   $\frac{3}{4}x - y + 4\frac{1}{4} = 0$   
 $b = 4\frac{1}{4}$

c) (1,5) ✓  $3x - 4y + 17 = 0$  No fractions for general form

d.)  $\sqrt{64+36}$   
 $= \sqrt{100}$   
 $= 10$  units ✓

3. a)  $A = (-4, -2)$   $B = (0, 0)$

4.)  $D = (-9, 0)$  ✓

Grad =  $\frac{-2-0}{-4-0} = \frac{1}{2}$  ✓

(b)  $E = (-3, 2)$  ✓

$y = \frac{1}{2}x + b$

c.) MP AC =  $(-3, 2)$  ✓

$0 = \frac{1}{2} \times 0 + b \rightarrow b = 0$

MP DB =  $(-3, 2)$  ✓

$\therefore y = \frac{1}{2}x$  ✓

$\therefore$  diagonals bisect each other since they share the same midpoint

b.) grad of BC =  $-\frac{1}{2}$

d.) Gradient of AB =  $\frac{3}{-7}$

$\therefore m_2 = \frac{7}{3}$  ✓

$y = -2x + b$  ✓

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

$6 = -4 + b \rightarrow b = 10$

$-3 = -4 \times \frac{7}{3} + b$

$\therefore y = -2x + 10$  ✓

$b = 1 \frac{2}{3}$  ✓

c.)  $y = -2x + 10$

$\therefore y = \frac{7}{3}x + 5 \frac{1}{3}$  ✓

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

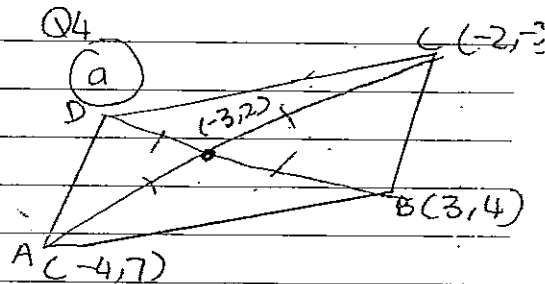
$\frac{1}{2}x = -2x + 10$

$\frac{5}{2}x = 10$

$x = \frac{10 \times 2}{5} = 4$

$y = -2 \times 4 = -8$

$y = 2$

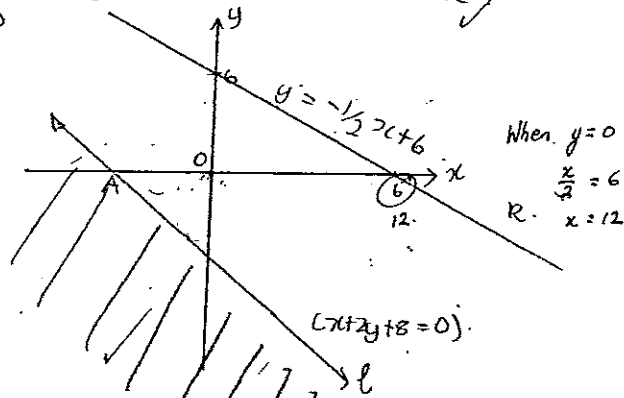


Q5)

a)  $x = (-8, 0)$  ✓

b.) Their gradients are the same ✓

c.)



d.)  $x + 2y + 8 < 0$

Let  $x$  be 0  
Let  $y$  be 0

$0 + 0 + 8 < 0$

This false

Q6.

1.)  $m_1 = \frac{1}{3}$  ✓

$y = mx + b$

$7 = \frac{1}{3} + b$

$b = 6 \frac{2}{3}$  ✓

$y = \frac{1}{3}x + 6 \frac{2}{3}$  ✓

2.) MP of AB =  $(7, 9)$

$9 = (\frac{1}{3} \times 7) + 6 \frac{2}{3}$

$9 = 9$

line  $l$  passes through the midpoint of AB