Maths
Leaving Certificate
Ordinary Level

Past Exam Questions
Marking Scheme on
Co-Ordinate Geometry

Q3 2013 Paper 2 Section A

Question 3 **(25 marks)**

(a) l is the line $3x+2y+18=0$. Find the slope of l.

$3x+2y+18=0 \quad \Rightarrow \quad 2y=-3x-18 \quad \Rightarrow \quad y=-\frac{3}{2}x-9$

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

(b) The line k is perpendicular to l and cuts the x-axis at the point $(7, 0)$.
Find the equation of k.

$k \perp l \quad \Rightarrow \quad m \times -\frac{3}{2}=-1 \quad \Rightarrow \quad m=\frac{2}{3}$

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

$k: y-0=\frac{2}{3}(x-7) \quad \Rightarrow \quad 3y=2x-14 \quad \Rightarrow \quad 2x-3y-14=0$

(c) Find the co-ordinates of the point of intersection of the lines l and k.

$$\begin{array}{l} 3x+2y=-18 \\ 2x-3y=14 \end{array} \Rightarrow \begin{array}{l} 9x+6y=-54 \\ \underline{4x-6y=28} \\ 13x \quad =-26 \end{array} \Rightarrow \quad x=-2$$

$3x+2y=-18 \quad \Rightarrow \quad 3(-2)+2y=-18 \quad \Rightarrow \quad 2y=-12 \quad \Rightarrow \quad y=-6$

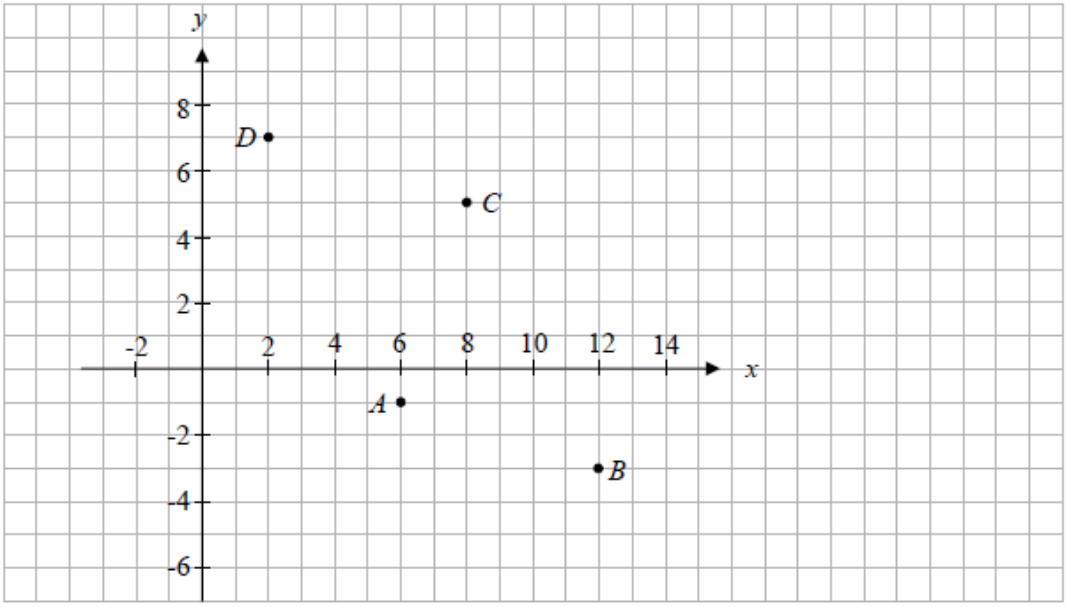
Co-ordinates: $(-2, -6)$

Q3 2012

Question 3 **(25 marks)**

$A(6, -1)$, $B(12, -3)$, $C(8, 5)$ and $D(2, 7)$ are four points.

(a) Plot the four points on the diagram below.



(b) Describe two different ways of showing, using co-ordinate geometry techniques, that the points form a parallelogram $ABCD$.

Any TWO of:

- Show that opposite sides are parallel by showing the slopes of opposite lines are equal.
- Show that the diagonals bisect each other by showing the midpoint of $[AC]$ equals the midpoint of $[DB]$.
- Show that the opposite sides are equal in length using the length formula.
- Show that $\overrightarrow{AB}$ maps D onto C or similar.

(c) Use one of the ways you have described to show that $ABCD$ is a parallelogram.

Slope $AB = \frac{-3+1}{12-6} = -\frac{2}{6}$, Slope $DC = \frac{7-5}{2-8} = -\frac{2}{6}$ $\Rightarrow AB \parallel DC$

Slope $BC = \frac{5+3}{8-12} = -2$, Slope $AD = \frac{7+1}{2-6} = -2$ $\Rightarrow BC \parallel AD$

Hence, $ABCD$ a parallelogram

or

Midpoint $[AC] = (\frac{6+8}{2}, \frac{-1+5}{2}) = (7,2)$, Midpoint $[BD] = (\frac{12+2}{2}, \frac{-3+7}{2}) = (7,2)$,

$\Rightarrow$ Diagonals bisect. Hence, $ABCD$ a parallelogram

or

Length $[AB] = \sqrt{(12-6)^2 + (-3+1)^2} = \sqrt{40}$

Length $[DC] = \sqrt{(2-8)^2 + (7-5)^2} = \sqrt{40}$

Length $[AD] = \sqrt{(6-2)^2 + (-1-7)^2} = \sqrt{80}$

Length $[BC] = \sqrt{(12-8)^2 + (-3-5)^2} = \sqrt{80}$

$\Rightarrow$ Opposite sides are equal. Hence, $ABCD$ a parallelogram

or

$A(6, -1) \rightarrow B(12, -3)$ maps $D(2, 7) \rightarrow (2+6, 7-2) = C(8, 5)$ or similar

$\Rightarrow \overrightarrow{AB} = \overrightarrow{DC}$. Hence, $ABCD$ a parallelogram