

# Coordinate Geometry

## Question Paper 4

<b>Level</b>	International A Level
<b>Subject</b>	Maths
<b>Exam Board</b>	CIE
<b>Topic</b>	Coordinate Geometry
<b>Sub Topic</b>	
<b>Booklet</b>	Question Paper 4

**Time Allowed:** 60 minutes

**Score:** /50

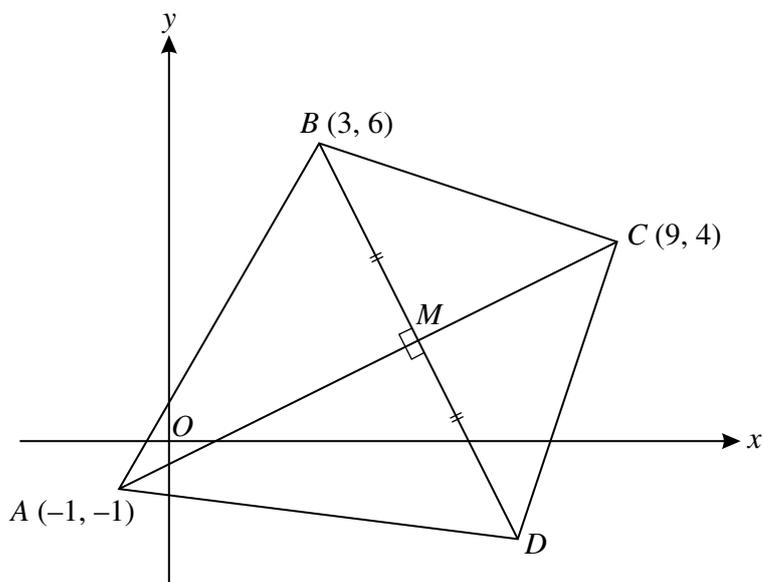
**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 The coordinates of  $A$  are  $(-3, 2)$  and the coordinates of  $C$  are  $(5, 6)$ . The mid-point of  $AC$  is  $M$  and the perpendicular bisector of  $AC$  cuts the  $x$ -axis at  $B$ .
- (i) Find the equation of  $MB$  and the coordinates of  $B$ . [5]
- (ii) Show that  $AB$  is perpendicular to  $BC$ . [2]
- (iii) Given that  $ABCD$  is a square, find the coordinates of  $D$  and the length of  $AD$ . [2]
- 2 The point  $A$  has coordinates  $(-1, -5)$  and the point  $B$  has coordinates  $(7, 1)$ . The perpendicular bisector of  $AB$  meets the  $x$ -axis at  $C$  and the  $y$ -axis at  $D$ . Calculate the length of  $CD$ . [6]
- 3 The curve  $y = \frac{10}{2x+1} - 2$  intersects the  $x$ -axis at  $A$ . The tangent to the curve at  $A$  intersects the  $y$ -axis at  $C$ .
- (i) Show that the equation of  $AC$  is  $5y + 4x = 8$ . [5]
- (ii) Find the distance  $AC$ . [2]
- 4 A line has equation  $y = kx + 6$  and a curve has equation  $y = x^2 + 3x + 2k$ , where  $k$  is a constant.
- (i) For the case where  $k = 2$ , the line and the curve intersect at points  $A$  and  $B$ . Find the distance  $AB$  and the coordinates of the mid-point of  $AB$ . [5]
- (ii) Find the two values of  $k$  for which the line is a tangent to the curve. [4]

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The diagram shows a quadrilateral  $ABCD$  in which the point  $A$  is  $(-1, -1)$ , the point  $B$  is  $(3, 6)$  and the point  $C$  is  $(9, 4)$ . The diagonals  $AC$  and  $BD$  intersect at  $M$ . Angle  $BMA = 90^\circ$  and  $BM = MD$ . Calculate

- (i) the coordinates of  $M$  and  $D$ , [7]
- (ii) the ratio  $AM : MC$ . [2]

- 6 (i) Express  $2x^2 - 4x + 1$  in the form  $a(x + b)^2 + c$  and hence state the coordinates of the minimum point,  $A$ , on the curve  $y = 2x^2 - 4x + 1$ . [4]

The line  $x - y + 4 = 0$  intersects the curve  $y = 2x^2 - 4x + 1$  at points  $P$  and  $Q$ . It is given that the coordinates of  $P$  are  $(3, 7)$ .

- (ii) Find the coordinates of  $Q$ . [3]
- (iii) Find the equation of the line joining  $Q$  to the mid-point of  $AP$ . [3]