MEI Core 1

Coordinate Geometry

Chapter assessment

Do not use a calculator in this test.

1. A line l_1 has equation $5y + 4x = 3$.
   (i) Find the gradient of the line. [1]
   (ii) Find the equation of the line l_2 which is parallel to l_1 and passes through the point (1, -2). [3]

2. Describe fully the curve whose equation is $x^2 + y^2 = 4$. [2]

3. The coordinates of two points are A (-1, -3) and B (5, 7). Calculate the equation of the perpendicular bisector of AB. [4]

4. Show that the line $y = 3x - 10$ is a tangent to the circle $x^2 + y^2 = 10$. [4]

5. The line $y = 2x - 3$ meets the x-axis at the point P, and the line $3y + 4x = 8$ meets the x-axis at the point Q. The two lines intersect at the point R.
   (i) Find the coordinates of R. [4]
   (ii) Find the area of triangle PQR. [3]

6. The equation of a circle is $x^2 + y^2 - 4x + 2y = 15$
   (i) Find the coordinates of the centre C of the circle, and the radius of the circle. [3]
   (ii) Show that the point P (4, -5) lies on the circle. [1]
   (iii) Find the equation of the tangent to the circle at the point P. [4]

7. The coordinates of four points are P (-2, -1), Q (6, 3), R (9, 2) and S (1, -2).
   (i) Calculate the gradients of the lines PQ, QR, RS and SP. [4]
   (ii) What name is given to the quadrilateral PQRS? [1]
   (iii) Calculate the length SR. [2]
   (iv) Show that the equation of SR is $2y = x - 5$ and find the equation of the line L through Q perpendicular to SR. [5]
   (v) Calculate the coordinates of the point T where the line L meets SR. [3]
   (vi) Calculate the area of the quadrilateral PQRS. [3]

8. AB is the diameter of a circle. A is (1, 3) and B is (7, -1).
   (i) Find the coordinates of the centre C of the circle. [2]
   (ii) Find the radius of the circle. [2]
   (iii) Find the equation of the circle. [2]
   (iv) The line $y + 5x = 8$ cuts the circle at A and again at a second point D. Calculate the coordinates of D. [4]
   (v) Prove that the line AB is perpendicular to the line CD. [3]

Total 60 marks