

OCR Additional Maths Exam Questions - Circles

- 4** AB is a diameter of a circle, where A is (1, 1) and B is (5, 3).  
Find
- (i) the exact length of AB, [2]
  - (ii) the coordinates of the midpoint of AB, [1]
  - (iii) the equation of the circle. [3]
- 9** The diameter of a circle is PQ, where P and Q are the points (1, 3) and (15, 1) respectively.
- (i) Find the centre of the circle. [2]
  - (ii) Show that the radius of the circle is  $5\sqrt{2}$ . [2]
  - (iii) Hence find the equation of the circle in the form  $x^2 + y^2 + ax + by + c = 0$ . [2]
- 1** Determine whether the point (5, 2) lies inside or outside the circle whose equation is  $x^2 + y^2 = 30$ .  
You must show your working. [3]
- 10** A (1, 10), B (8, 9) and C (7, 2) are three points.
- (i) Find the coordinates of the midpoint, M, of AC. [1]
  - (ii) Find the equation of the circle with AC as diameter. [4]
  - (iii) Show that B lies on this circle. [1]
  - (iv) Prove that AM and BM are perpendicular. [3]
  - (v) BD is a diameter of this circle. Find the coordinates of D. [3]
- 11** A circle has equation  $(x - 2)^2 + y^2 = 100$ .
- (a) Write down the radius and the coordinates of the centre, C, of this circle. [2]
- The line  $y = 2x + 6$  cuts the circle at two points, A and B.
- (b) Find
- (i) the coordinates of A and B, [5]
  - (ii) the midpoint, M, of AB, [1]
  - (iii) the length AB. [2]
- (c) Hence find the distance of the centre of the circle from the line AB. [2]

- 7 The points A and B have coordinates (3, 7) and (5, 11) respectively.
- (i) Find the exact length of AB. [2]
  - (ii) Find the equation of the circle with diameter AB. [3]
- 9 The equation of the circle C is  $x^2 + y^2 - 8x + 2y - 19 = 0$ .
- (i) Express the equation of C in the form  $(x - a)^2 + (y - b)^2 = r^2$ . [4]
  - (ii) Hence or otherwise, use an algebraic method to decide whether the point (8, 3) lies inside, outside or on the circumference of the circle.  
Show all your working. [2]
- 12 (i) A circle has equation  $x^2 + y^2 - 2x - 4y - 20 = 0$ . Find the coordinates of its centre, C, and its radius. [3]
- (ii) Find the coordinates of the points, A and B, where the line  $y = x + 2$  cuts the circle. [5]
  - (iii) Find the angle ACB. [4]
- 4 (i) Find the distance between the points (2, 3) and (7, 9). [2]
- (ii) Hence find the equation of the circle with centre (2, 3) and passing through the point (7, 9). [2]
- 3 A circle has equation  $x^2 + y^2 - 4x - 6y + 3 = 0$ .
- Find the coordinates of the centre and the radius of the circle. [3]