

# OCR Core 1

## Coordinate Geometry

### Section 2: Circles

#### Exercise

Do not use a calculator in this exercise.

- Find, in the form  $x^2 + y^2 + px + qy = c$ , the equation for each of the following circles.
  - centre (0, 0), radius 6
  - centre (3, 1), radius 5
  - centre (-2, 5), radius 1
  - centre (0, -4), radius 3
- For each of these circles, write down the coordinates of the centre and the radius.
  - $x^2 + y^2 = 100$
  - $(x - 2)^2 + (y - 7)^2 = 16$
  - $(x + 3)^2 + (y - 4)^2 = 4$
  - $(x + 4)^2 + (y + 5)^2 = 20$
- For each of these circles, find the coordinates of the centre and the radius.
  - $x^2 + y^2 + 4x - 5 = 0$
  - $x^2 + y^2 - 6x + 10y + 20 = 0$
  - $x^2 + y^2 - 2x - 3y + 3 = 0$
- The point C is (4, -2) and the point A is (6, 3).  
Find the equation of the circle centre C and radius CA.
- The points A (2, 0) and B (6, 4) form the diameter of a circle. Find the equation of the circle.
- A circle passes through the points Q(0, 3) and R(0, 9) and touches the  $x$ -axis.  
Work out two possible equations.
- Show that the line  $y = 4 - x$  is a tangent to the circle  $x^2 + y^2 = 8$ .
  - Show that the line  $4y = 3x - 25$  is a tangent to the circle  $x^2 + y^2 = 25$ .
- The line  $2y + x = 10$  meets the circle  $x^2 + y^2 = 65$  at P and Q.  
Calculate the length of PQ.
- The points P (-2, 6), Q (6, 0) and R (5, 7) all lie on a circle.
  - Show that PR is perpendicular to QR.
  - Explain why the result from (i) shows that PQ is a diameter of the circle.
  - Hence calculate the equation of the circle.

## OCR C1 Coord. geom. Section 2 Exercise

10. (i) Write down the equation of the circle centre  $(0, 0)$  and radius  $\sqrt{17}$ .
- (ii) Show that the point  $P(-4, -1)$  lies on the circle.
- (iii) Find the equation of the tangent at  $P$ .
- (iv) The line  $x + y = 3$  meets the circle at two points,  $Q$  and  $R$ .  
Find the coordinates of  $Q$  and  $R$ .
- (v) Find the coordinates of the point,  $S$ , where the tangent at  $P$  intersects the line  $x + y = 3$ .