

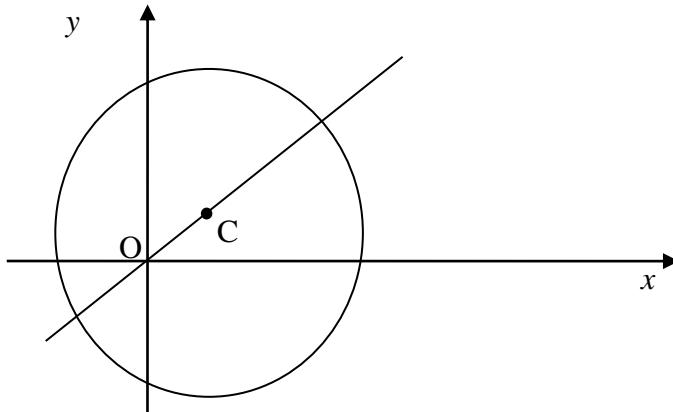
## Section 2: Circles

### Exercise

- Write down 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.
  - $x^2 + y^2 = 100$
  - $(x-2)^2 + (y-7)^2 = 16$
  - $(x+3)^2 + (y-4)^2 = 4$
  - $(x+4)^2 + (y+5)^2 = 20$
- Describe the transformations that map
  - the circle  $x^2 + y^2 = 4$  to the circle  $(x-5)^2 + (y+2)^2 = 4$
  - the circle  $(x+1)^2 + (y-3)^2 = 16$  to the circle  $x^2 + y^2 = 16$ .
- 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.

## AQA FM Coordinate geometry 2 Exercise

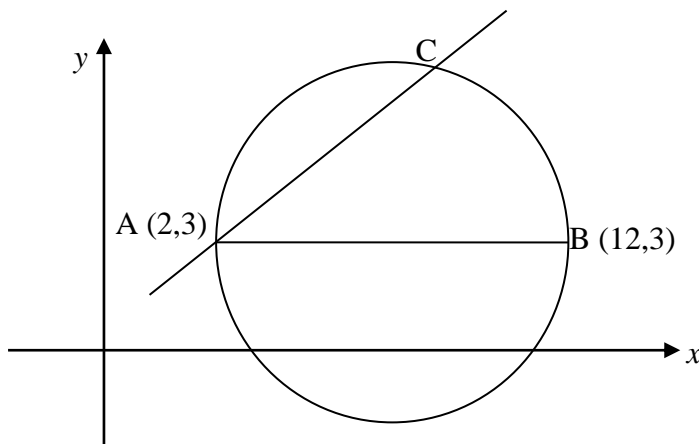
10. The diagram shows the circle with equation  $(x-2)^2 + (y-2)^2 = 16$ . C is the centre of the circle.



Find the equation of a circle which has the following properties.

- The circle has the same radius as the given circle.
- The centre of the circle is on the line OC.
- The circle touches the  $x$ -axis.

11. AB is a diameter of a circle. C lies on the circle. The equation of the line AC is  $2y - x = 4$ .



Find the coordinates of point C.

12. A circle goes through the origin O and the point A = (3, 1). The centre of the circle is on the line  $y = 2$ .
- Find the equation of the perpendicular bisector of OA
  - Hence find the coordinates of the centre of the circle.

## AQA FM Coordinate geometry 2 Exercise

13. A circle has equation  $(x - 4)^2 + (y - 1)^2 = 10$ . The circle goes through points  $A = (1,0)$  and  $B = (5,4)$ .
- (i) Find the equations of the tangents to the circle at A and B
  - (ii) Find the point where the tangents at A and B intersect
14. The points  $A = (-2, 2)$ ,  $B = (6, 2)$  and  $D = (0, -4)$  lie on a circle.
- (i) Find the equation of the perpendicular bisector of A and B
  - (ii) Find the equation of the perpendicular bisector of B and D
  - (iii) Determine the centre of the circle by finding where these two lines intersect
  - (iv) Work out the equation of the circle