

## The Circle

1. Write down the equation of each circle below

(a) Centre the Origin, radius 4

(b) Centre the Origin, radius  $\sqrt{6}$

(c) Centre (-1,4), radius 5

(d) Centre (-2,-5), radius  $\sqrt{10}$

2. Write down the centre and radius of each circle below

(a)  $x^2 + y^2 = 25$

(b)  $x^2 + y^2 = 12$

(c)  $(x - 3)^2 + (y - 2)^2 = 36$

(d)  $(x + 1)^2 + (y - 4)^2 = 10$

(e)  $x^2 + y^2 - 10x - 6y - 2 = 0$

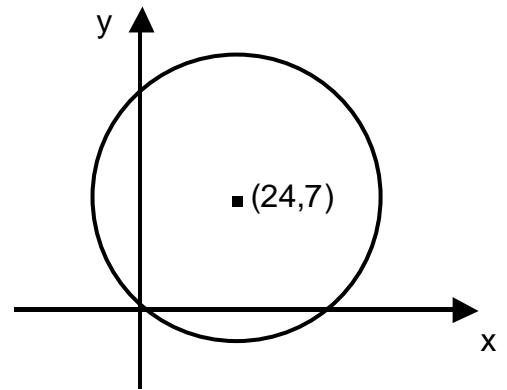
(f)  $x^2 + y^2 + 6x + 4y + 4 = 0$

3. (a) The point (a,5) lies on the circle with equation  $x^2 + y^2 = 74$ . Find two values for a.

(b) The point (3,c) lies on the circle  $x^2 + y^2 - 4x + 6y + 12 = 0$ . Find c.

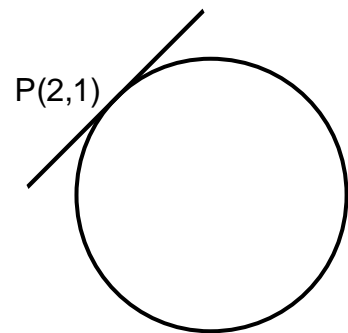
4. The lines  $x = -2$ ,  $x = 10$ ,  $y = -5$  and  $y = 7$  are tangents to a circle. Find the equation of this circle.

5. The circle shown has centre (24,7) and passes through the origin. Find its equation.

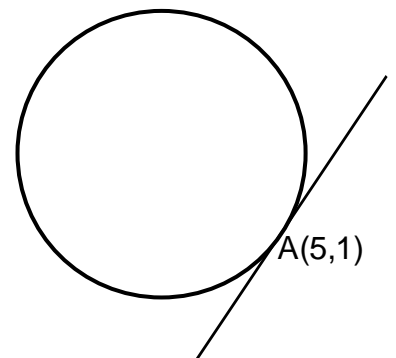


6. The diagram shows the circle with equation  $(x - 4)^2 + (y + 5)^2 = 40$ .

Find the equation of the tangent to this circle at the point P(2,1).



7. The diagram shows the circle  $x^2 + y^2 - 6x - 4y + 8 = 0$ . Find the equation of the tangent to this circle at the point A(5,1).



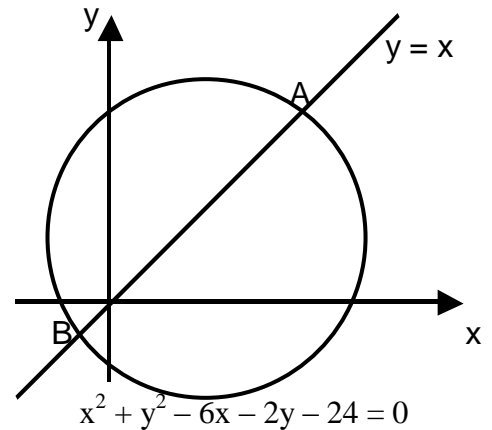
8. Find the equation of the tangent to the circle  $x^2 + y^2 - 10y - 43 = 0$  at the point  $(2, -3)$ .

9. Find the points of intersection of the line  $y = 2x + 8$  and the circle with equation  $x^2 + y^2 + 4x + 2y - 20 = 0$ .

10. Find the points of intersection of the circle  $x^2 + y^2 - 2x - 4y + 1 = 0$  and the line  $x + y = 1$ .

11. The straight line  $y = x$  cuts the circle  $x^2 + y^2 - 6x - 2y - 24 = 0$  at A and B.

- (a) Find the coordinates of A and B.
- (b) Find the equation of the circle which has AB as diameter.



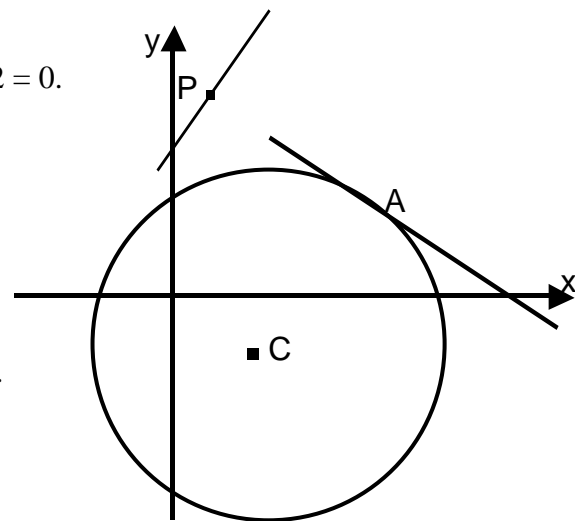
12. Show that the line  $y = -3x - 10$  is a tangent to the circle  $x^2 + y^2 - 8x + 4y - 20 = 0$ , and find the point of contact.

13. The circle, centre C, has equation  $x^2 + y^2 - 4x + 6y - 12 = 0$ .

- (a) Find the equation of the tangent at the point  $A(5, 1)$  on this circle.

The line through  $P(1, 4)$  at right angles to this tangent has equation  $4x - 3y + 8 = 0$ .

- (b) Show that this line is also a tangent to the circle.

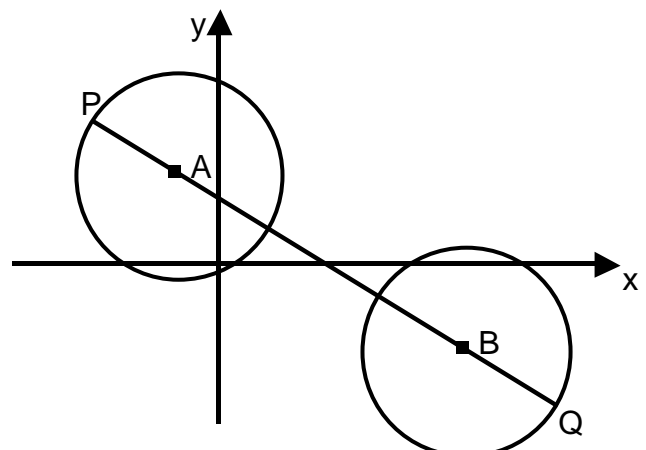


14. In the diagram,

The circle, centre A, has equation  $x^2 + y^2 + 2x - 8y - 8 = 0$ .

The circle, centre B, has equation  $x^2 + y^2 - 22x + 10y + 121 = 0$ .

The line PQ passes through A and B.  
Calculate the length of the line PQ.



15. In the diagram opposite, the centres A, B and C are collinear.

The equations of the outer circles are  $(x + 12)^2 + (y + 15)^2 = 25$  and  $(x - 24)^2 + (y - 12)^2 = 100$ .

Find the equation of the central circle.

