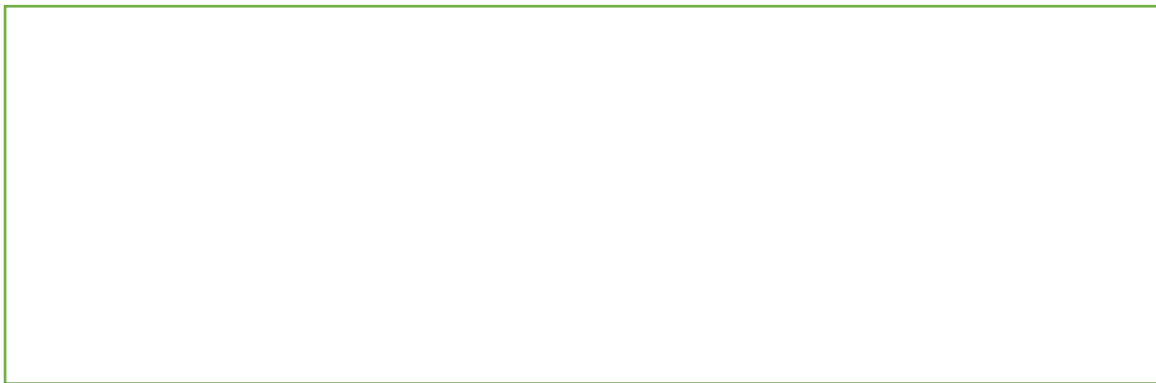
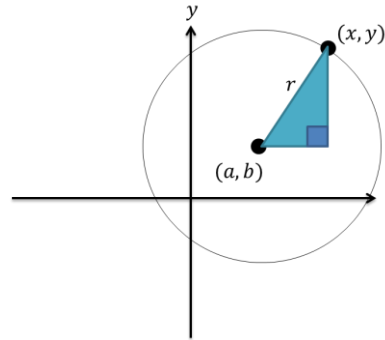
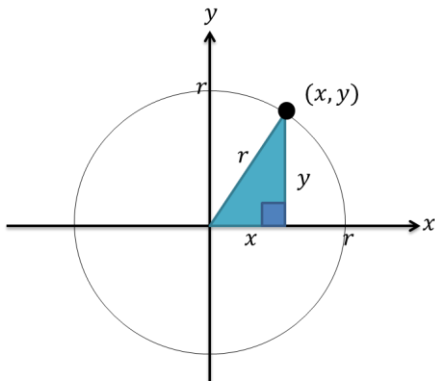


Equation of a circle



Examples:

1.

Centre	Radius	Equation
(0,0)	5	
(1,2)	6	
		$(x + 3)^2 + (y - 5)^2 = 1$
		$(x + 5)^2 + (y - 2)^2 = 49$
		$(x + 6)^2 + y^2 = 16$
		$(x - 1)^2 + (y + 1)^2 = 3$
		$(x + 2)^2 + (y - 3)^2 = 8$

2. A line segment AB is the diameter of a circle, where A and B have coordinates $(5,8)$ and $(-7,4)$ respectively. Determine the equation of the circle.

Test your understanding

The points A and B have coordinates $(5, -1)$ and $(13, 11)$ respectively.

(a) Find the coordinates of the mid-point of AB .

(2)

Given that AB is a diameter of the circle C ,

(b) find an equation for C .

(4)

Completing the Square

Example

Find the centre and radius of the circle with equation $x^2 + y^2 - 6x + 2y - 6 = 0$

Test your understanding

The circle C with centre T and radius r has equation

$$x^2 + y^2 - 20x - 16y + 139 = 0$$

- (a) Find the coordinates of the centre of C . (3)
- (b) Show that $r = 5$ (2)

Extension:

1. [MAT 2009 1B] The point on the circle $x^2 + y^2 + 6x + 8y = 75$ which is closest to the origin, is at what distance from the origin?

2. [MAT 2007 1D]

The point on the circle $(x - 5)^2 + (y - 4)^2 = 4$ which is closest to the circle $(x - 1)^2 + (y - 1)^2 = 1$ has what coordinates?

3. [MAT 2016 1I] Let a and b be positive real numbers. If $x^2 + y^2 \leq 1$ then the largest that $ax + by$ can equal is what?

Give your expression in terms of a and b .