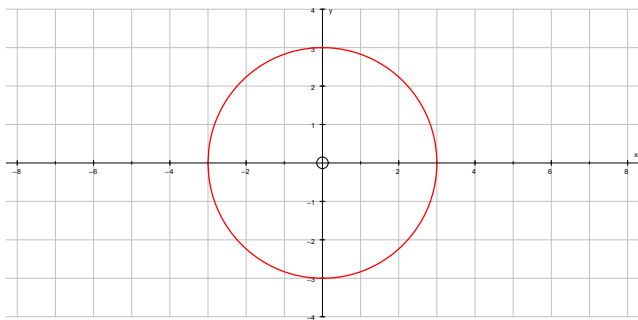


Circles Summary

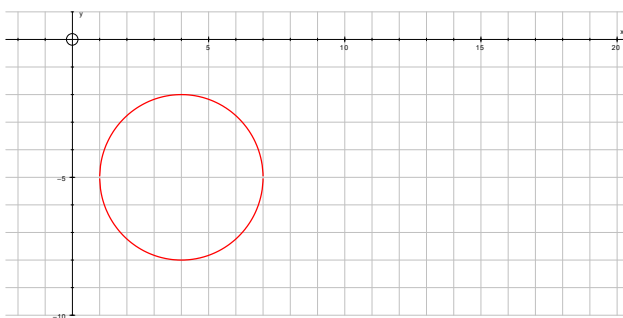
What is the equation of the circle with centre the origin and radius r ?		What is the centre and radius of the circle $x^2 + y^2 = 9$?	
What is the equation of the circle with centre (a, b) and radius r ?		Write down the equation of the circle with centre $(3, -2)$ and radius 5	
How do we find the centre and radius of a circle if it is in the expanded form, for example $x^2 - 6x + y^2 + 8y - 11 = 0$?		Find the centre and radius of the circle $x^2 + 4x + y^2 - 2y + 4 = 0$	
How do we show that a point lies on a circle?		Show that the point $(5, 3)$ lies on the circle with equation $(x - 4)^2 + (y - 3)^2 = 1$	
How do we check whether a point lies inside or outside a circle?		Does the point $(7, 3)$ lie inside or outside the circle $(x - 4)^2 + (y + 1)^2 = 36$?	

Equations of Circles



The equation of a circle with centre the origin and radius r is $x^2 + y^2 = r^2$

$$x^2 + y^2 = 9$$



The equation of a circle with centre (a, b) and radius r is
 $(x - a)^2 + (y - b)^2 = r^2$

$$(x - 4)^2 + (y + 5)^2 = 9$$

Example 1

What is the equation of the circle with centre $(-2, 5)$ and radius 4

Example 2

Where is the centre and what is the radius of the circle $(x + 2)^2 + (y + 7)^2 = 121$?

Example 3

Where is the centre and what is the radius of the circle $x^2 + 10x + y^2 - 12y + 57 = 0$?

Equations of Circles

Equation	Centre	Radius
$x^2 + y^2 = 4^2$		
$(x-2)^2 + (y-1)^2 = 6^2$		
$(x+6)^2 + y^2 = 25$		
$3(x-3)^2 + 3(y-11)^2 = 27$		
	(1,6)	3
	(-2,7)	1
	(10,-4)	9
	$\left(2, -\frac{1}{2}\right)$	10
$x^2 - 2x + y^2 + 2y - 2 = 0$		
$x^2 + 10x + y^2 - 4x = 7$		
$x^2 - 6x + y^2 - 8y + 24 = 0$		
$4x^2 + 4x + 4y^2 - 8y - 11 = 0$		

Solutions to Equations of Circles

Equation	Centre	Radius
$x^2 + y^2 = 4^2$	(0,0)	4
$(x-2)^2 + (y-1)^2 = 6^2$	(2,1)	6
$(x+6)^2 + y^2 = 25$	(-6,0)	5
$3(x-3)^2 + 3(y-11)^2 = 27$	(3,11)	3
$(x-1)^2 + (y-6)^2 = 9$	(1,6)	3
$(x+2)^2 + (y-7)^2 = 1$	(-2,7)	1
$(x-10)^2 + (y+4)^2 = 81$	(10,-4)	9
$(x-2)^2 + \left(y + \frac{1}{2}\right)^2 = 100$	$\left(2, -\frac{1}{2}\right)$	10
$x^2 - 2x + y^2 + 2y - 2 = 0$ $(x-1)^2 + (y+1)^2 = 4$	(1,-1)	2
$x^2 + 10x + y^2 - 4x = 7$ $(x+5)^2 + (y-2)^2 = 36$	(-5,2)	6
$x^2 - 6x + y^2 - 8y + 24 = 0$ $(x-3)^2 + (y-4)^2 = 1$	(3,4)	1
$4x^2 + 4x + 4y^2 - 8y - 11 = 0$ $x^2 + x + y^2 - 2y - \frac{11}{4} = 0$ $\left(x + \frac{1}{2}\right)^2 + (y-1)^2 = 4$	$\left(-\frac{1}{2}, 1\right)$	2