Coordinate Geometry: The Circle

chapter 4

Section 4.1 The equation of a circle with centre (0, 0)

PROJECT MATHS – STRAND 2
Text & Tests 4
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HIGHER LEVEL

The equation of the circle with centre $(0, 0)$ and radius r is $x^2 + y^2 = r^2$.

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

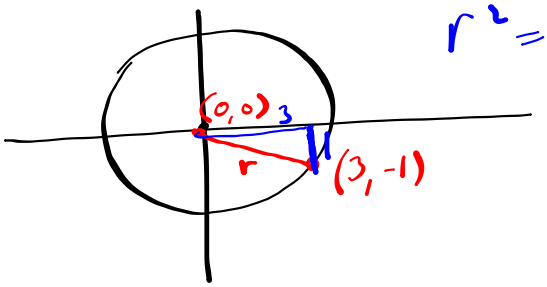
Example 1

A circle has its centre at $(0, 0)$ and passes through the point $(3, -1)$.

(i) Find the length of the radius of the circle.

(ii) Find the equation of the circle.

$x^2 + y^2 = r^2$



$r^2 = 3^2 + 1^2 = 9 + 1 = 10$ ✓

$r = \sqrt{10}$ ✓

$x^2 + y^2 = 10$

Exercise 4.1

1. Write down the equation of the circle with centre $(0, 0)$ and radius

(i) 2 (ii) 5 (iii) $\sqrt{2}$ (iv) $3\sqrt{2}$ (v) $\frac{3}{4}$ (vi) $2\frac{1}{2}$

(i) $x^2 + y^2 = 4$

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

(iii) $x^2 + y^2 = 2$

(iv) $x^2 + y^2 = 18$

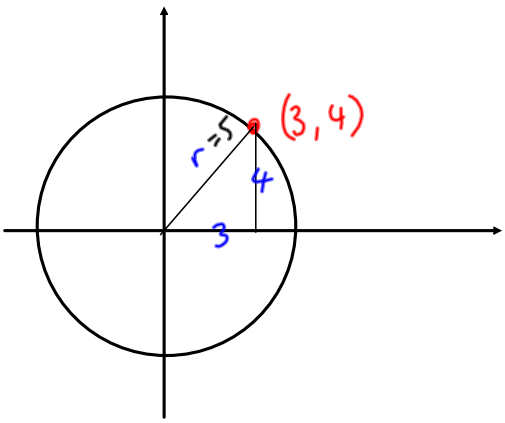
(v) $x^2 + y^2 = \frac{9}{16}$

(vi) $x^2 + y^2 = \frac{25}{4}$

Circle with centre (0,0)

$x^2 + y^2 = r^2$

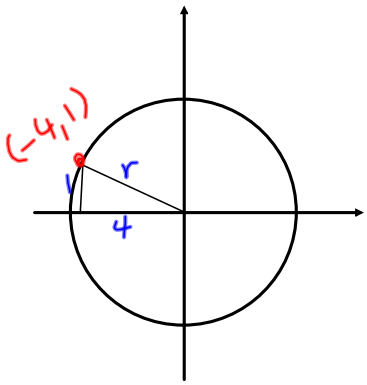
2. A circle with centre $(0, 0)$ contains the point $(3, 4)$.
Find the equation of the circle.



$x^2 + y^2 = r^2$

$\Rightarrow x^2 + y^2 = 25$

3. Find the equation of the circle with centre $(0, 0)$ and which passes through the point $(-4, 1)$.



Circle: $x^2 + y^2 = r^2$

$\Rightarrow x^2 + y^2 = 17$

$r^2 = 1^2 + 4^2 = 17$