

The Equation of a Circle

10th Grade

Centre, radius, and the completing-the-square step that reveals both.

A circle with centre (h, k) and radius r has equation $(x - h)^2 + (y - k)^2 = r^2$.

$$(x - h)^2 + (y - k)^2 = r^2$$

$$(x-2)^2 + (y+3)^2 = 25$$

Note the sign flip on k .

centre $(2, -3)$, $r = 5$

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

Centred at the origin.

centre $(0,0)$, $r = 3$

$$r^2 = 25$$

The equation stores r^2 , not r .

$r = 5$

Expanded form

complete the square twice

Once for the x terms, once for the y terms.

THE COMMON MISTAKE

✗ reading r as 25

✓ $r = 5$

The right-hand side is r squared. Take the root.

It is the distance formula rearranged — every point exactly r from the centre.