

Finding Points of Intersection

If you need to find where a circle meets a line then solve the two equations simultaneously.

Example 1. Find where the line $y = x + 5$ meets the circle $x^2 + (y - 2)^2 = 29$

Substitute $y = x + 5$ into $x^2 + (y - 2)^2 = 29$

$$x^2 + ((x + 5) - 2)^2 = 29$$

$$x^2 + (x + 3)^2 = 29$$

$$x^2 + x^2 + 6x + 9 = 29$$

$$2x^2 + 6x - 20 = 0$$

$$x^2 + 3x - 10 = 0$$

$$(x + 5)(x - 2) = 0$$

$$x = -5 \text{ or } x = 2$$

$$\text{if } x = -5 \quad y = x + 5$$

$$y = -5 + 5$$

$$y = 0 \quad (-5, 0)$$

$$\text{if } x = 2 \quad y = x + 5$$

$$y = 2 + 5$$

$$y = 7 \quad (2, 7)$$

So the line meets the circle at $(-5, 0)$ and $(2, 7)$.

If you get no solutions when you try and solve two equations then it means the lines do not meet