

Core 1

Coordinate Geometry

Section 2: Curves and circles

Crucial points

1. **Draw a diagram**

In most questions involving coordinate geometry, it is helpful to draw a sketch diagram. It does not need to be accurate, but it will help to give you a rough idea of the answer you might expect.

2. **Make sure that you can recognise standard curves**

Look at the diagrams on pages 60 and 61 and make sure that you know the forms of these curves.

3. **Make sure you know the standard circle equations**

The general equation of a circle, centre $(0, 0)$ and radius r is:

$$x^2 + y^2 = r^2 \quad \text{WHY?}$$

The general equation of a circle, centre (a, b) and radius r is:

$$(x-a)^2 + (y-b)^2 = r^2 \quad \text{WHY?}$$

4. **Finding the intersection of a line and a curve**

To find the coordinates of the point(s) where a line meets a curve, you solve the equations simultaneously. The condition for the line to be a tangent to the curve is that there is a repeated root. (For a line and a quadratic curve this means that the discriminant of the resulting quadratic equation is 0, i.e. $b^2 - 4ac = 0$).

To find the coordinates of the point(s) where two curves meet you **solve their equations simultaneously**.

5. **You are expected to know these circle properties:**

- (i) the angle in a semicircle is a right angle
- (ii) the perpendicular from the centre of a circle to a chord bisects the chord
- (iii) the tangent to a circle at a point is perpendicular to the radius through that point

These circle properties are often useful in examination questions. Keep them in mind when answering questions involving circles.