



Graph sketching

Move the circle from the origin  
**a** units to the **right**  
**b** units **upwards**

$$r = \sqrt{g^2 + f^2 - c}$$

Used for  
 intersection problems  
 between circles and lines

Quadratic Theory  
 Discriminant

$$b^2 - 4ac < 0$$

**NO** intersection

$$b^2 - 4ac > 0$$

**2 pts** of intersection

Factorisation

$$b^2 - 4ac = 0$$

**line is a tangent**

Straight line Theory

Perpendicular  
 equation  
 $m_1 \times m_2 = -1$

$$x^2 + y^2 + 2g \cdot x + 2f \cdot y + c = 0$$

**The  
 Circle**

Two circles touch  
**internally** if  
 the distance

$$C_1 C_2 = (r_2 - r_1)$$

Two circles touch  
**externally** if  
 the distance

$$C_1 C_2 = (r_1 + r_2)$$

Distance formula

$$C_1 C_2 = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

Centre  
 (a,b)

Centre  
 (-g,-f)

$$(x-a)^2 + (y-b)^2 = r^2$$

Pythagoras Theorem  
 Rotated  
 through 360 deg.

**Special case**

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

Centre  
 (0,0)

**Mind Map**

For Higher Maths Topic : The Circle  
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