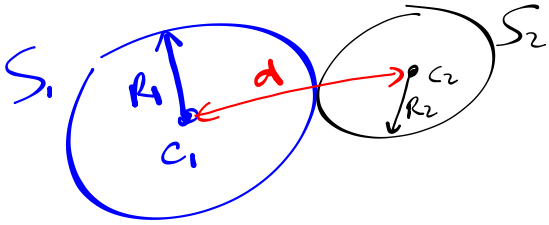
Chapter 4 Coordinate Geometry: The Circle

Section 4.6 Touching circles – Chords and circles



$R_1 + R_2 < d \Rightarrow$ touch at 2 points

$R_1 + R_2 = d \Rightarrow$ externally touch

$R_1 + R_2 > d \Rightarrow$ don't touch

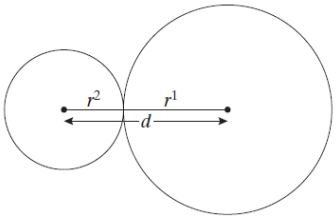
$R_1 - R_2 = d \Rightarrow$ internally touch

PROJECT MATHS – STRAND 2
Text & Tests 4
LEAVING CERTIFICATE HIGHER LEVEL

1. Circles touching externally or internally

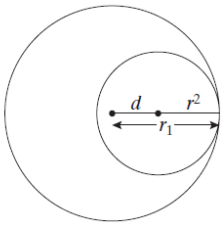
externally

$d = r_1 + r_2$



internally

$d = r_1 - r_2$



Example 1

Show that the circles s_1: $x^2 + y^2 - 6x - 4y + 11 = 0$ and s_2: $x^2 + y^2 + 4x + 6y - 19 = 0$ touch externally.

Consider S_1

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

S_1

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

If touch externally $\Rightarrow R_2 + R_1 = d$

$C_1(3, 2)$ $\quad R_1 = \sqrt{3^2 + 2^2 - 11} = \sqrt{2}$

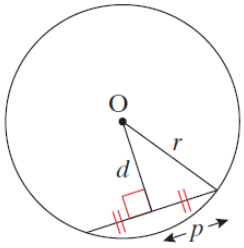
$C_2(-2, -3)$ $\quad R_2 = \sqrt{2^2 + 3^2 + 19} = 4\sqrt{2}$

$d = \sqrt{(-3-2)^2 + (-2-3)^2} = \sqrt{50} = 5\sqrt{2}$

Yes: $R_2 + R_1 = \sqrt{2} + 4\sqrt{2} = 5\sqrt{2} = d$

they touch externally

2. Chords and circles

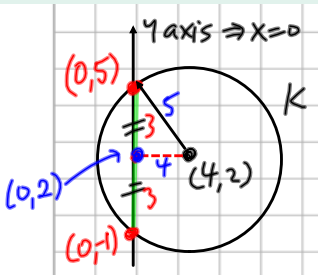


The perpendicular from the centre of a circle to a chord bisects the chord.

Example 2

A circle k has centre C(4, 2) and makes a chord 6 units in length on the y-axis. Find the equation of k.

h k
(4, 2)



Radius = 5

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

K: $(x-4)^2+(y-2)^2=25$