

Coordinate Geometry: The Circle

chapter

4

Section 4.4 Tangents to a circle

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

125

1. Finding the equation of the tangent to a circle at the point P on the circle

Example 1

Find the equation of the tangent to the circle $x^2 + y^2 - 4x + 2y - 20 = 0$ at the point $(5, -5)$ on the circle.

$C(-g, -f)$
 $m = ?$
 $y - y_1 = m(x - x_1)$
 $m_{CT} \perp m_L$
 $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $(5, -5) \in L$

$T(5, -5)$
 $C(2, -1)$

$m_{CT} = \frac{-5 - (-1)}{5 - 2} = \frac{-4}{3}$
 $\Rightarrow m_L = \frac{3}{4}$
 $\Rightarrow L: y - (-5) = \frac{3}{4}(x - 5)$
 $4(y + 5) = 3(x - 5)$
 $4y + 20 = 3x - 15$
 $3x - 4y - 35 = 0$

1. Finding the equation of the tangent to a circle at the point P on the circle

Example 1

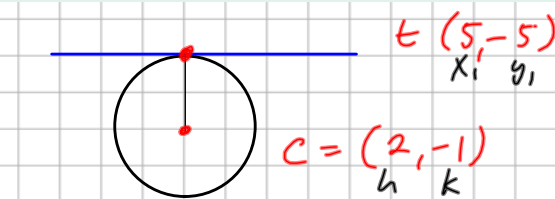
Find the equation of the tangent to the circle $x^2 + y^2 - 4x + 2y - 20 = 0$ at the point $(5, -5)$ on the circle.

2.19 Formula method

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

Radius ✓
Centre ✓
tangent pt ✓

Tangent equation \Rightarrow



$$r = \sqrt{2^2 + 1^2 + 20} = \sqrt{25} = 5$$

$$(x-h)(x_1-h) + (y-k)(y_1-k) = r^2$$

$$(x-2)(5-2) + (y-(-1))(-5-(-1)) = 5^2$$

$$(x-2)(3) + (y+1)(-4) = 25$$

$$3x - 6 - 4y - 4 = 25$$

$$3x - 4y - 35 = 0$$