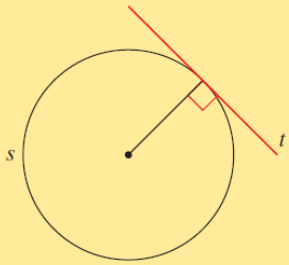
10. i Find the equation of the circle s with centre $(0, 0)$ and radius $2\sqrt{5}$.

ii t is the line $x - 2y + 10 = 0$.
By finding the distance from the centre of s to the line t, determine whether t is a tangent to s.



A line is a tangent to a circle if the perpendicular distance from the centre of the circle to the line is equal to the radius length.

(i)
Centre $(0,0) \Rightarrow$
$x^2 + y^2 = R^2$

s: $x^2 + y^2 = 20$

(ii) distance between line and centre $(0,0)$?

$d = \dfrac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$

$d = \dfrac{|1(0) - 2(0) + 10|}{\sqrt{1^2 + 2^2}} = \dfrac{|10|}{\sqrt{5}}$

$d = 2\sqrt{5}$

Conclusion: Since $d = 2\sqrt{5} = R \Rightarrow$ t is a tangent to s