Circle – Equation of a Tangent

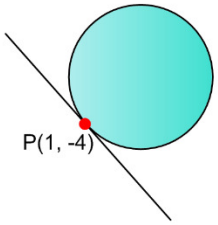
1. Find the equation of the tangent passing through the point on the circumference of the given circle.

(a) $x^2 + y^2 - 14x - 6y + 18 = 0$, tangent at (1, 5)

(b) $(x - 3)^2 + (y - 6)^2 = 25$, tangent at (7, 9)

(c) $x^2 + y^2 - 2x - 4y + 3 = 0$, tangent at (2, 1)

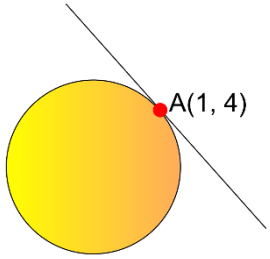
(d) $(x + 2)^2 + (y - 3)^2 = 169$, tangent at (-7, 15)

2. 

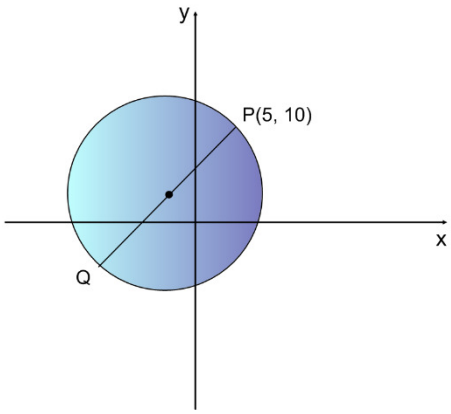
Find the equation of the tangent to the circle $x^2 + y^2 - 8x + 4y - 33 = 0$ at the point P(1,-4).

3. (a) Find the equation of the tangent to the circle $x^2 + y^2 + 10x - 2y - 19 = 0$ at the point A(1,4).

(b) Show that this tangent is also a tangent to the parabola $y = 2x^2 - 10x + 14$ and find the point of contact.



4. PQ is a diameter of the circle $(x + 1)^2 + (y - 2)^2 = 100$ as shown in the diagram.



(a) Prove the point P(5, 10) lies on the circumference of the circle.
(b) Find the equation of the tangent at P.
(c) Find the equation of the tangent at Q.