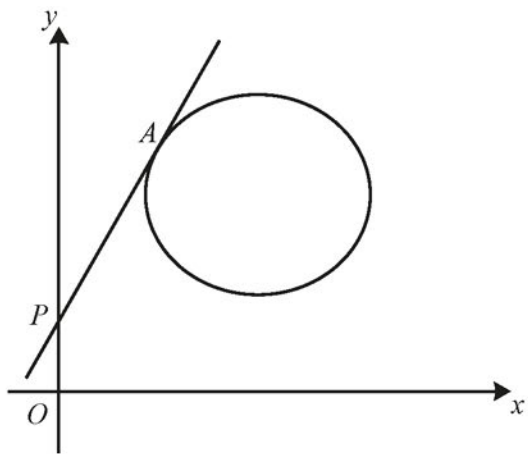


11 In this question you must show detailed reasoning.



The diagram shows a circle with equation $x^2 + y^2 - 10x - 14y + 64 = 0$. A tangent is drawn from the point $P(0, 2)$ to meet the circle at the point A . The equation of this tangent is of the form $y = mx + 2$, where m is a constant **greater than 1**.

(a) (i) Show that the x -coordinate of A satisfies the equation $(m^2 + 1)x^2 - 10(m + 1)x + 40 = 0$. **[2]**

(ii) Hence determine the equation of the tangent to the circle at A which passes through P . **[4]**

A second tangent is drawn from P to meet the circle at a second point B . The equation of this tangent is of the form $y = nx + 2$, where n is a constant **less than 1**.

(b) Determine the exact value of $\tan APB$. **[4]**