Coordinate Geometry in x-y plane – 2021/20 GCE Pure Mathematics A

1. Nov/2021/Paper_H240/02/No.5

In this question you must show detailed reasoning.

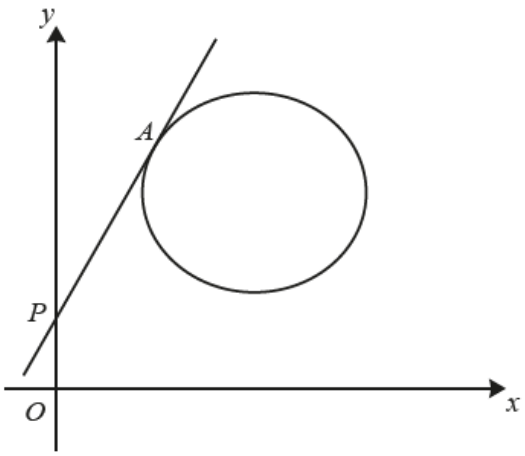
Points A, B and C have coordinates $(0, 6)$, $(7, 5)$ and $(6, -2)$ respectively.

(a) Find an equation of the perpendicular bisector of AB. **[3]**

(b) Hence, or otherwise, find an equation of the circle that passes through points A, B and C. **[5]**

2. Nov/2020/Paper_H240/01/No.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]**