S.4 Add Maths Quiz 17(b)

Time allowed:

Total Mark:

1. Find the values of p and q if the equation $px^2 + qy^2 - (p+q+1)x - 2py = 0$ represents a circle with centre on the y-axis.

2. Given two circles

$$C_1 : x^2 + y^2 - 4x + 2y - 20 = 0$$
$$C_2 : x^2 + y^2 - 14x - 10y + 64 = 0$$

(a) Find a if C_1 and C_2 intersect at A(a, 2).

(b) Find the slope of the tangent to each circle at A, and hence find the angle between the two tangents at A.

3. Given a circle $C_1 : x^2 + y^2 - 4x - 12 = 0$ with centre P and a line $L : y = mx - 6$.

(a) If L cuts C_1 at two distinct points A(x_1, y_1) and B(x_2, y_2), show that

(i) x_1 and x_2 are the roots of the quadratic equation $(1+m^2)x^2 - 4(3m+1)x + 24 = 0$,

(ii) length of $\text{AB} = 4\sqrt{\dfrac{3m^2 + 6m - 5}{1+m^2}}$.

(b) (i) Find the radius of C_1.

(ii) Hence, find $\angle \text{APB}$ if $m = \dfrac{4}{3}$

End of Quiz