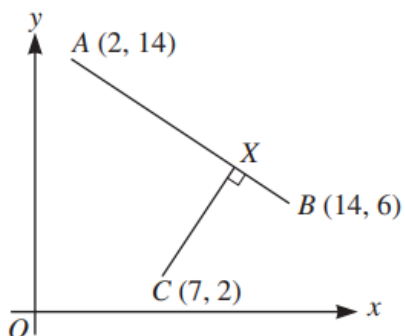# Coordinate Geometry 2

Q1.

The straight line $y = mx + 14$ is a tangent to the curve $y = \dfrac{12}{x} + 2$ at the point P. Find the value of the constant m and the coordinates of P. [5]

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Q2.

The point R is the reflection of the point $(-1, 3)$ in the line $3y + 2x = 33$. Find by calculation the coordinates of R. [7]

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Q3.

The diagram shows three points $A\,(2, 14)$, $B\,(14, 6)$ and $C\,(7, 2)$. The point X lies on AB, and CX is perpendicular to AB. Find, by calculation,

(i) the coordinates of X, [6]

(ii) the ratio $AX : XB$. [2]

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Q4.

The point A has coordinates $(-1, 6)$ and the point B has coordinates $(7, 2)$.

(i) Find the equation of the perpendicular bisector of AB, giving your answer in the form $y = mx + c$. [4]

(ii) A point C on the perpendicular bisector has coordinates (p, q). The distance OC is 2 units, where O is the origin. Write down two equations involving p and q and hence find the coordinates of the possible positions of C. [5]

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Q5.
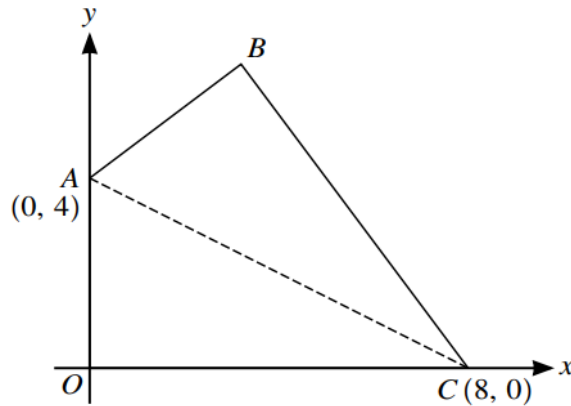
The diagram shows a kite $OABC$ in which AC is the line of symmetry. The coordinates of A and C are $(0, 4)$ and $(8, 0)$ respectively and O is the origin.

(i) Find the equations of AC and OB. [4]

(ii) Find, by calculation, the coordinates of B. [3]

Q6.

Points A and B have coordinates (h, h) and $(4h + 6, 5h)$ respectively. The equation of the perpendicular bisector of AB is $3x + 2y = k$. Find the values of the constants h and k. [7]

Q7.

A circle with centre $(5, 2)$ passes through the point $(7, 5)$.

(a) Find an equation of the circle. [2]

The line $y = 5x - 10$ intersects the circle at A and B.

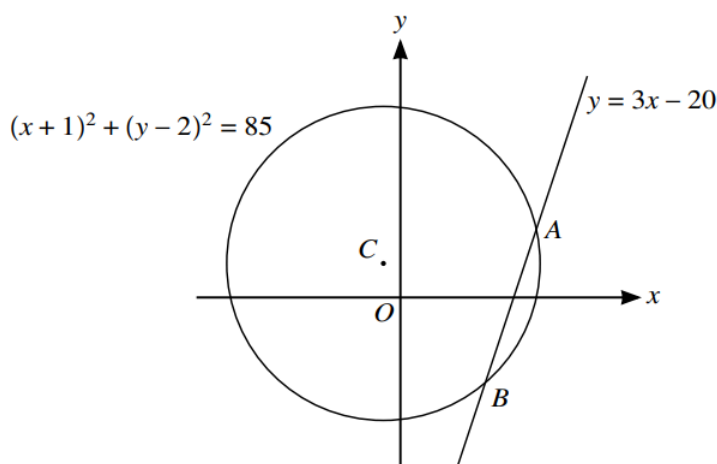**(b)** Find the exact length of the chord AB. [7]

Q8.

The line $y = 2x + 5$ intersects the circle with equation $x^2 + y^2 = 20$ at A and B.

(a) Find the coordinates of A and B in surd form and hence find the exact length of the chord AB.

[7]

A straight line through the point $(10, 0)$ with gradient m is a tangent to the circle.

(b) Find the two possible values of m.

[5]

Q9.

The circle with equation $(x + 1)^2 + (y - 2)^2 = 85$ and the straight line with equation $y = 3x - 20$ are shown in the diagram. The line intersects the circle at A and B, and the centre of the circle is at C.

(a) Find, by calculation, the coordinates of A and B.

[4]

(b) Find an equation of the circle which has its centre at C and for which the line with equation $y = 3x - 20$ is a tangent to the circle.

[4]

Q10.

The equation of a circle is $x^2 + y^2 + 6x - 2y - 26 = 0$.

(a) Find the coordinates of the centre of the circle and the radius. Hence find the coordinates of the lowest point on the circle.

[4]

(b) Find the set of values of the constant k for which the line with equation $y = kx - 5$ intersects the circle at two distinct points.

[6]