6 MUST KNOW QUESTIONS TO <u>CONQUER</u>

CIRCLES

1 (i) Write down the equation of the circle with centre $A(8, 2)$ and radius $\sqrt{80}$.
This circle intersects the y-axis at points P and Q.
(ii) Find the length PQ.
A second circle, centre B, also passes through P and Q.
(iii) State the y-coordinate of B.
Given that the x-coordinate of B is negative and that the radius of the second circle is 5, find
(iv) the x-coordinate of B.

Ans: $(x - 8)^2 + (y - 2)^2 = 80$, (ii) $PQ = 8\ units$, (iii) 2 (iv) $k = 3\ (rej), k = -3$

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2 The equation of a circle C is $x^2 + 6x + y^2 - 10y = 66$.
(i) Find the radius and the coordinates of the centre of the circle.
(ii) Given that PQ is the diameter of the circle, where P is the point $(5, 11)$, find the coordinates of the point Q.
(iii) Find the equation of the circle C_1, which is a reflection of the circle C in the line $x = -1$.

Ans: $radius = 10 units$, (ii) $Q(-11, -1)$, (iii) $(x - 1)^2 + (y - 5)^2 = 100$

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3 A circle C_1 has the equation $(x - 4)^2 + (y - 6)^2 = 100$ and another circle C_2 has the equation $x^2 + y^2 + 2x - 16y + 49 = 0$.
  (i) Find the coordinates of the centre of the circle C_2 and its radius.
  (ii) Show that C_2 lies completely inside of C_1,

Ans: (i) $Centre\ (-1, 8)$ (ii) Shown

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4 The positive x- and y-axes are tangents to a circle C.
(i) What can be deduced about the coordinates of the centre of C.
The line T is tangent to C at the point $(8, 1)$ on the circle. Given that the centre of C lies above and to the right of $(8, 1)$, find
(ii) the equation of C,
(iii) the equation of T.

Ans: (i) The values of the x and y coordinates are the same.
(ii) $(x - 13)^2 + (y - 13)^2 = 13^2$ (iii) $y = -\frac{5}{12}x + \frac{13}{3}$

5 A circle, centre C, has a diameter AB where A is the point $(-13, -4)$ and B is the point $(3, 8)$.

(i) Find the coordinates of C and the radius of the circle.

(ii) Find the equation of the circle.

(iii) Show that the equation of the tangent to the circle at A is $3y + 4x = -64$.

Ans: $C(-5, 2)$, radius $= 10$, (ii) $(x + 5)^2 + (y - 2)^2 = 100$ (iii) Shown

6 A circle C_1, centre $C(3, -1)$, has a diameter AB where A is the point $(6, 3)$.

(i) Find the radius of the circle C_1 and the coordinates of B.

(ii) Find the equation of the circle C_1.

(iii) Show that the equation of the tangent to the circle at A is $4y + 3x - 30 = 0$.

The circle C_2 is the reflection of the circle C_1 along the y-axis.

(iv) Find the equation of the circle C_2.

(v) Find the coordinates of the points of intersection of the two circles.

Ans: (i) r = 5 units, $B = (0, -5)$ (ii) Eqn C_1: $(x - 3)^2 + (y + 1)^2 = 5^2$

(iii) Shown (iv) C_2: $(x + 3)^2 + (y + 1)^2 = 5^2$ (v) $(0, 3)$ & $(0, -5)$