Circle Geometry Problems

(a) A circle C has the equation $x^2 + (y+3)^2 = 169$. The line $x = 5$ passes through the circle at points A and B. Find the length of the line AB.

(b) The points A $(-3, 5)$ and B $(7, 1)$ lie on circle C. The line AB is a diameter of the circle. Find the equation of the circle.

(a) (5,9) and (5,-15)
Length = 24

(b) $(x-2)^2 + (y-3)^2 = 29$

(a) The point P with coordinates $(1,8)$ lies on the circle with equation $x^2 + y^2 + 4x - 6y - 21 = 0$. Point Q also lies on the circle, and PQ is a diameter of the circle. Find the coordinates of point Q.

(b) A circle C has centre $(-3, -1)$. Point P with coordinates $(3, 2)$ lies on circle C. Find the coordinates of the points where the circle crosses the y-axis.

(a) $(x+2)^2 + (y-3)^2 = 34$
Q $(-5, -2)$

(b) $(x+3)^2 + (y+1)^2 = 45$
$(0, 5)$ and $(0, -7)$

(a) Determine whether the point $(4, 5)$ lies inside, outside or on the circle with equation $x^2 + y^2 + 4y - 49 = 0$.

(b) A circle has diameter AB where A is $(-5, -1)$ and B is $(0, -7)$. Find the equation of the tangent to the circle at point A, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers to be found.

(a) Radius = $\sqrt{53}$
Distance from centre to (4,5) = $\sqrt{65}$
∴ Outside the circle

(b) $5x - 6y + 19 = 0$

(a) A circle with equation $x^2 + y^2 = 25$ has centre O and passes through the point P with coordinates $(3, 4)$. Line L is the tangent to the circle at point P. Line L meets the x-axis at A and the y-axis at B. Find the area of the triangle OAB.

(b) The circle C has the equation $x^2 + y^2 - 12x + 4y - 24 = 0$. Find the two values of a for which the line $y = a$ is a tangent to circle C.

(a) L: $y = -\frac{3}{4}x + \frac{25}{4}$

Area = $\frac{625}{24}$

(b) Tangents at (6,6) & (6,-10)
So $a = 6$ and $a = -10$