**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) 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) 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) 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.

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