Line and Circle Geometry Revision

(a)

The points $A\ (6,-1)$ and $B\ (-4,3)$ lie on the line l_1. Find the equation of l_1 in the form $ax + by + c = 0$.

(b)

The equation of a circle is given by $(x-3)^2 + (y+1)^2 = 49$. Show that the point $(7,-6)$ lies inside the circle.

(c)

Find the equation of the perpendicular bisector of the line segment joining $(1,-4)$ and $(-2,11)$

(d)

Find the centre and radius of the circle with equation $x^2 + y^2 - 6x + 5y - 5 = 0$

(e)

The line with equation $x + y = a$ is a tangent to the circle with equation $x^2 - 4x + y^2 - 2y = 3$.
Find the possible values of a.

(f)

$A\ (9,-2)$ and $B\ (5,-4)$
AB is the diameter of a circle. Find the equation of the circle in the form $x^2 + y^2 + ax + by + c = 0$

(g)

The line l_1 with equation $y = 2x + 1$ meets the y-axis at point A.
The line l_2, which is perpendicular to l_1, passes through point $B\ (2,5)$ and meets the y-axis at point C. Find the area of triangle ABC.

(h)

A circle C has equation $x^2 + 2bx + y^2 - 4y - 10 = 0$.
Given that the line $2x + y = 6$ intersects C at two distinct points, find the range of possible values for b.