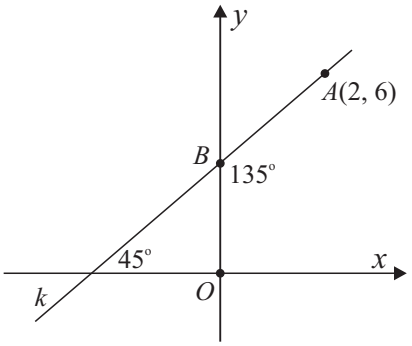
Sample Paper 7: Paper 2

Question 2 (25 marks)

Question 2 (a)

Line k makes an angle of 45° with the positive x-axis. The slope of k is the tan of the angle the line makes with the positive x-axis.



$\tan 45^\circ = 1 = m,\ (x_1,\ y_1) = A(2,\ 6)$ $\boxed{y - y_1 = m(x - x_1)}$

$y - 6 = 1(x - 2)$

$y - 6 = x - 2$

$k : x - y + 4 = 0$

Question 2 (b)

$x + y - 1 = 0 \Rightarrow y = 1 - x$

$Q(x,\ y) = (x,\ 1 - x)$

$P(-1,\ 2)$

Area $= \frac{1}{2}|2x - (1 - x)(-1)| = 7$ $\boxed{\text{Area} = \frac{1}{2}|x_1 y_2 - x_2 y_1|}$

$\therefore |2x + 1 - x| = 14$

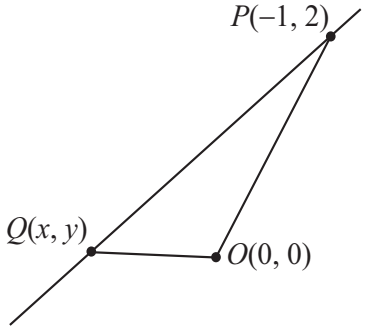
$|x + 1| = 14$

$x + 1 = \pm 14$

$\therefore x = 13,\ \cancel{-15}\ (x > 0)$

$y = 1 - x = -12$

$\therefore Q(13,\ -12)$



Question 2 (c)

The midpoint of $[PQ]$ is the centre of the circle. Call it R.

$P(-1,\ 2),\ Q(13,\ -12)$

$R = \left(\frac{-1 + 13}{2},\ \frac{2 - 12}{2}\right) = (6,\ -5)$

$P(-1,\ 2),\ R(6,\ -5)$

$r = |PR| = \sqrt{(6 + 1)^2 + (-5 - 2)^2} = \sqrt{49 + 49} = 7\sqrt{2}$

Equation of circle:

$(x - h)^2 + (y - k)^2 = r^2$

$(x - 6)^2 + (y + 5)^2 = 98$