LINE (Q 3, PAPER 2)

2010

3 (a) The line $3x + 4y - 7 = 0$ is perpendicular to the line $ax - 6y - 1 = 0$.
Find the value of a.

(b) (i) The line $4x - 5y + k = 0$ cuts the x-axis at P and the y-axis at Q.
Write down the co-ordinates of P and Q in terms of k.

(ii) The area of the triangle OPQ is 10 square units, where O is the origin.
Find the two possible values of k.

(c) f is the transformation $(x, y) \to (x', y')$, where $x' = x + y$ and $y' = x - y$.
The line l has equation $y = mx + c$.

(i) Find the equation of $f(l)$, the image of l under f.

(ii) Find the value(s) of m for which $f(l)$ makes an angle of 45° with l.

ANSWERS

3 (a) $a = 8$

(b) (i) $P(-\frac{k}{4}, 0)$, $Q(0, \frac{k}{5})$ (ii) $k = \pm 20$

(c) (i) $(m-1)x' + (m+1)y' + 2c = 0$ (ii) $m = -1, 0, 1$