

**LINE (Q 3, PAPER 2)**

**2003**

3 (a)  $f$  is the transformation  $(x, y) \rightarrow (x', y')$  where  $x' = x + y$  and  $y' = x - y$ .  $L$  is the line  $4x - 2y - 1 = 0$ . Find the equation of  $f(L)$ , the image of  $L$  under  $f$ .

3 (b)  $K$  is the line  $3x - 4y + 9 = 0$ . The point  $a(-3, 0)$  is on  $K$ .

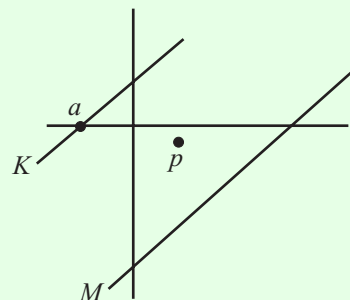
The line  $M$  is parallel to  $K$ . The point  $p(2, -1)$  is midway between  $K$  and  $M$ .

(i) Find the equation of  $M$ .

(ii) Calculate the distance between  $K$  and  $M$ .

(iii) Calculate the measure of the acute angle between  $ap$  and  $K$ . Give your answer correct to the nearest degree.

(iv)  $b(x, y)$  is a point on  $K$  such that  $|ab| = 15$  and  $x > 0$ . Find the value of  $x$  and the value of  $y$ .



**ANSWERS**

3 (a)  $f(L) = x' + 3y' - 1 = 0$

3 (b) (i)  $3x - 4y - 29 = 0$     (ii)  $\frac{38}{5}$     (iii)  $48^\circ$     (iv)  $x = 9, y = 9$