

LINE (Q 3, PAPER 2)

1996

3 (a) (i) The parametric equations of the lines  $L$  and  $K$  are:

$$L: x = t + \frac{1}{2}, y = 2t + 7$$

$$K: x = \frac{1-t}{3}, y = t - 5.$$

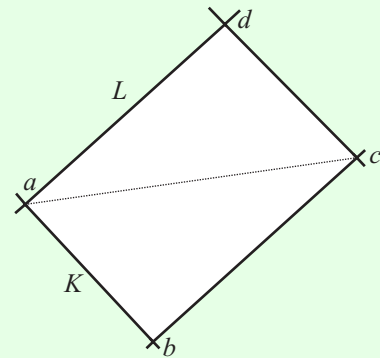
Show that their Cartesian equations are

$$L: 2x - y + 6 = 0$$

$$K: 3x + y + 4 = 0$$

and find  $a$ , their point of intersection.

(ii) If  $L$  and  $K$  contain adjacent sides of a parallelogram  $abcd$  and the mid-point of  $[ac]$  is  $(0, 3\frac{1}{2})$ , find the coordinates of vertices  $c$ ,  $b$  and  $d$ .



(b) If  $p = (0, 0)$  and  $q = (1, 2)$  show that

$$x = t, y = 2t, 0 \leq t \leq 1$$

are parametric equations of the line segment  $[pq]$ .

Find the image of this segment under the transformation

$$x' = 3x - y$$

$$y' = x - y.$$

ANSWERS

3 (a) (i)  $a(-2, 2)$  (ii)  $b(-1, -1), c(2, 5), d(1, 8)$

(b)  $f(p) = (0, 0), f(q) = (1, -1)$