

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

**2004**

- 3 (a)  $a(-1, 4)$  and  $b(9, -1)$  are two points and  $p$  is a point in  $[ab]$ . Given that  $|ap|:|pb|=2:3$ , find the co-ordinates of  $p$ .
- 3 (b) (i) Calculate the perpendicular distance from the point  $(-1, -5)$  to the line  $3x - 4y - 2 = 0$ .
- (ii) The point  $(-1, -5)$  is equidistant from the lines  $3x - 4y - 2 = 0$  and  $3x - 4y + k = 0$ , where  $k \neq -2$ . Find the value of  $k$ .
- 3 (c)  $f$  is the transformation  $(x, y) \rightarrow (x', y')$ , where  $x' = 2x - y$  and  $y' = x + y$ .  $L$  is the line  $y = mx + c$ .  $K$  is the line through the origin that is perpendicular to  $L$ .
- (i) Find the equation of  $f(L)$  and the equation of  $f(K)$ .
- (ii) Find the values of  $m$  for which  $f(K) \perp f(L)$ . Give your answer in surd form.

**ANSWERS**

3 (a)  $p(3, 2)$

3 (b) (i) 3 (ii)  $k = -32$

3 (c) (i)  $f(L) = (m+1)x' + (m-2)y' + 3c = 0$ ;  $f(K) = (1-m)x' + (2m+1)y' = 0$

(ii)  $m = \frac{1}{2}(3 \pm \sqrt{13})$