

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

**2008**

- 3 (a) The parametric equations  $x = 7t - 4$  and  $y = 3 - 3t$  represents a line, where  $t \in \mathbf{R}$ . Find the Cartesian equation of the line.
- (b)  $a(2, 1)$ ,  $b(10, 7)$ ,  $c(14, 10)$  and  $d(7, 1)$  are four points.
- (i) Plot  $a$ ,  $b$ ,  $c$  and  $d$  on the co-ordinate plane.
- (ii) Verify that  $|ab| = 2|bc|$  and  $|ab| = 2|ad|$ .
- (iii) Find  $a'$ ,  $b'$ ,  $c'$  and  $d'$ , the repective images of  $a$ ,  $b$ ,  $c$  and  $d$  under the transformation  $f : (x, y) \rightarrow (x', y')$ , where  $x' = x + y$  and  $y' = x - 2y$ .
- (iv) Verify that  $|a'b'| = 2|b'c'|$  but that  $|a'b'| \neq 2|a'd'|$ .
- (c) Prove that the perpendicular distance from the point  $(x_1, y_1)$  to the line  $ax + by + c = 0$  is  $\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$ .

**ANSWERS**

3 (a)  $3x + 7y - 9 = 0$

(b) (iii)  $a'(3, 0)$ ,  $b'(17, -4)$ ,  $c'(24, -6)$ ,  $d'(8, 5)$