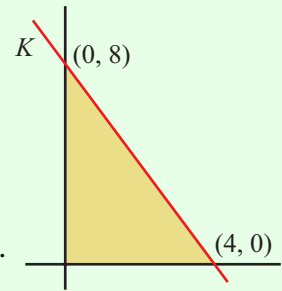


**LINEAR PROGRAMMING (Q 11, PAPER 2)**

**2005**

11 (a) The line  $K$  cuts the  $x$ -axis at  $(4, 0)$  and the  $y$ -axis at  $(0, 8)$ .

- (i) Find the equation of  $K$ .
- (ii) Write down the three inequalities that together define the region enclosed by  $K$ , the  $x$ -axis and the  $y$ -axis.



(b) A manufacturer of garden furniture produces plastic chairs and tables. Each chair requires 2 kg of raw material and each table requires 5 kg of raw material. In any working period the raw material used cannot exceed 800 kg.

Each chair requires 4 minutes of machine time and each table requires 4 minutes of machine time. The total machine time available in any working period is 1000 minutes.

- (i) Taking  $x$  as the number of chairs and  $y$  as the number of tables, write down two inequalities in  $x$  and  $y$  and illustrate these on graph paper.
- (ii) The manufacturer sells each chair for €20 and each table for €40. How many of each should be produced in each working period to maximise income?
- (iii) The manufacturer's costs for each chair are €17 and for each table are €34.70. Express the profit as a percentage of income, assuming the income has been maximised.

**ANSWERS**

- 11 (a) (i)  $2x + y - 8 = 0$   
(ii)  $x \geq 0, y \geq 0, 2x + y - 8 \leq 0$
- (b) (i)  $2x + 5y \leq 800, x + y \leq 250$   
(ii)  $x = 150, y = 100$   
(iii) 14%