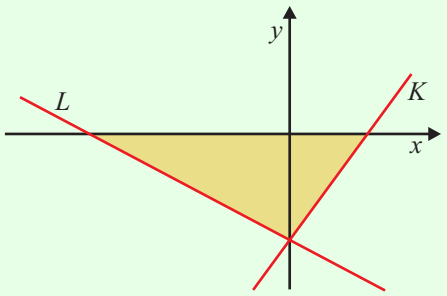
LINEAR PROGRAMMING (Q 11, PAPER 2)

2006

11 (a) The equation of the line L is $5x + 8y + 40 = 0$.
The equation of the line K is $10x - 7y - 35 = 0$.
Write down the 3 inequalities that together define the shaded region in the diagram.



(b) Due to a transport disruption, a bus company is contracted at short notice to carry up to 1500 passengers to complete their journey. Passengers not carried by this company will be carried by a taxi company.

The bus company has available standard buses and mini-buses. Each standard bus carries 60 passengers and each mini-bus carries 30 passengers.

Each bus is operated by one driver and there are at most 30 drivers available.

(i) Taking x as the number of standard buses and y as the number of mini-buses, write down two inequalities in x and y and illustrate them on graph paper.

(ii) The operating profit for the journey is €80 for a standard bus and €50 for a minibus. How many of each type of bus should be used in order to maximise the profit?

(iii) If the bus company paid each driver a bonus for working at short notice, the operating profit for each bus would be reduced by €30. By how much would this decrease the maximum profit available to the company?

ANSWERS

11 (a) $5x+8y+40 \geq 0,\ 10x-7y-35 \leq 0,\ y \leq 0$

(b) (i) $x+y \leq 30,\ 2x+y \leq 50$

(ii) $x = 20,\ y = 10$

(iii) €850