4.

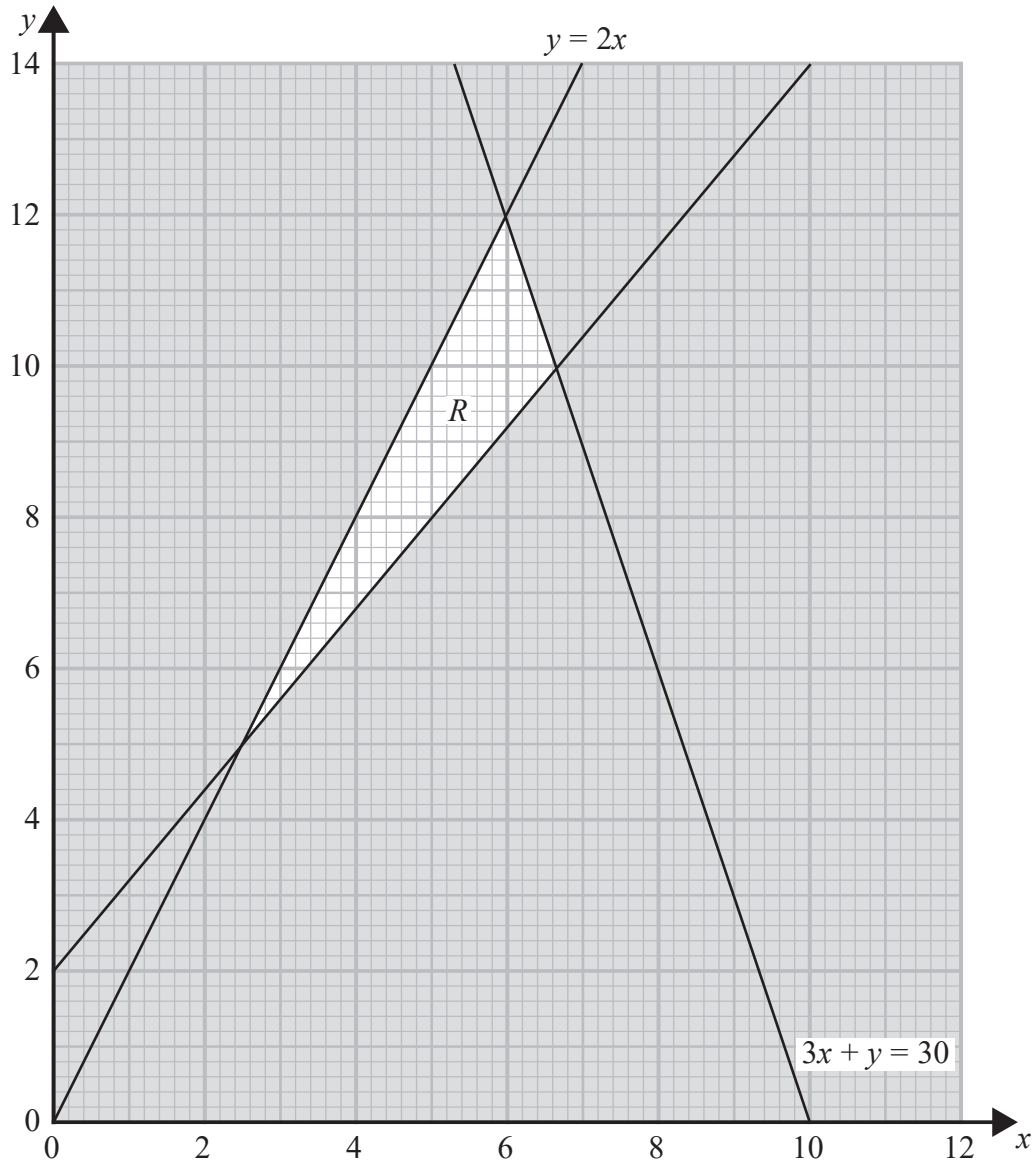


Figure 2

Figure 2 shows the constraints of a linear programming problem in x and y, where R is the feasible region. The equations of two of the lines are shown on the graph.

(a) Determine the inequalities that define the feasible region.

(3)

(b) Find the exact coordinates of the vertices of the feasible region.

(3)

The objective is to maximise P, where $P = 2x + ky$

(c) For the case $k = 3$, use the point testing method to find the optimal vertex of the feasible region and state the corresponding value of P.

(3)

(d) Determine the range of values for k for which the optimal vertex found in (c) is still optimal.

(2)

(Total for Question 4 is 11 marks)