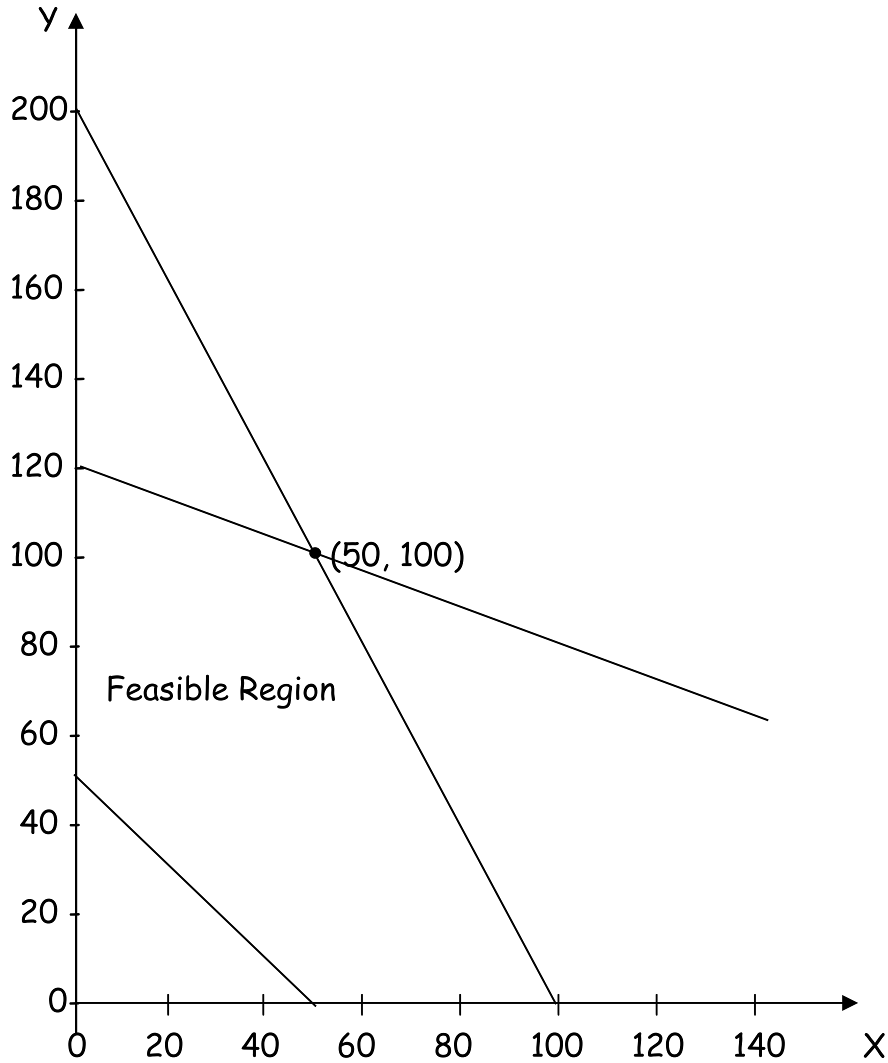
Linear programming 1 Total: 30 marks

1.



(a) For this feasible region find

(i) the maximum value of the function $2x + 3y$ **(3)**

(ii) the minimum value of the function $4x + y$ **(2)**

(b) Find the **five** inequalities that define the feasible region. **(6)**

2. (a) Represent on the same graph the set of points (x, y) for which

$x \geq 2$, $y \geq 10$, $4x + y \geq 24$ and $3x + 2y \geq 36$. **(4)**

(b) Show also the points where $2x + y \leq 30$. **(1)**

(c) Hence find the **points** in this region, with whole number values for x and y, at which $2x + y$ takes its smallest value. **(4)**

3. (a) Maximise $P = x + y$ subject to the constraints:

$$3x + 4y \leq 12$$

$$2x + y \leq 4$$

$$y \geq 0.5x$$

$$x \geq 0, \; y \geq 0$$

(You must show that you have solved simultaneous equations for the cross over point).

(b) Repeat given the constraint that x and y must be integers.

In each case also state the coordinates of the point at which the maximum occurs.

(10)