4. A linear programming problem in x, y and z is described as follows.

Maximise $P = -x + y$

subject to

$$x + 2y + z \leqslant 15$$

$$3x - 4y + 2z \geqslant 1$$

$$2x + y + z = 14$$

$$x \geqslant 0,\ y \geqslant 0,\ z \geqslant 0$$

(a) (i) Eliminate z from the first two inequality constraints, simplifying your answers.

(ii) Hence state the maximum possible value of P

(4)

Given that P takes the maximum possible value found in (a)(ii),

(b) (i) determine the maximum possible value of x

(ii) Hence find a solution to the linear programming problem.

(3)

(Total for Question 4 is 7 marks)