Optimisation Assignment - LLLL76

QUESTION ONE

PART ONE

Maximise:

$$-x_1 + 10 * x_2$$

Subject to:

$$x_1 + x_2 <= 10$$

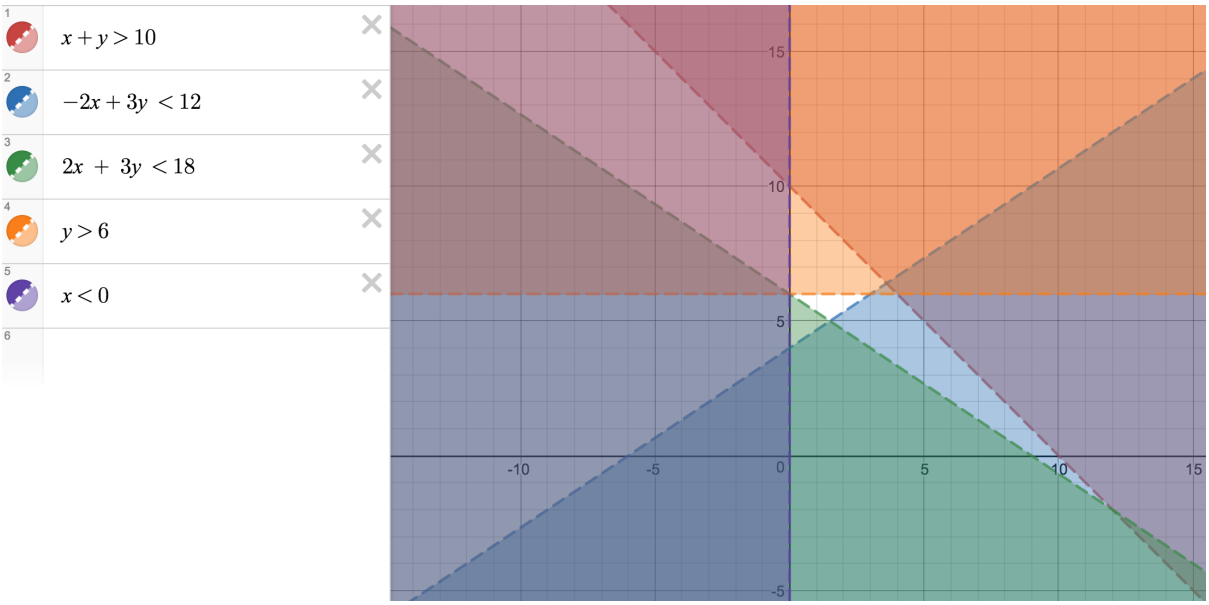
$$-2x_1 + 3x_2 >= 12$$

$$2x_1 + 3x_2 >= 18$$

$$x_2 <= 6$$

$$x_1 >= 0$$

Where $x_1 = X$ and $x_2 = Y$



PART TWO

If:

$$X + Y <= 10$$

$$-2X + 3Y >= 12$$

$$X >= 0$$

are removed from the graph or:

$$x_1 + x_2 <= 10$$

$$-2x_1 + 3x_2 >= 12$$

$$x_1 >= 0$$

is removed from the question, then the optimal solution will remain the same.

PART THREE

$$x_1 + x_2^+ - x_2^- + x_3 = 10$$

$$-2x_1 + 3x_2^+ - 3x_2^- - x_4 = 12$$

$$2x_1 + 3x_2^+ - 3x_2^- - x_5 = 18$$

$$x_2^+ - x_2^- + x_6 = 6$$

$$x_1, x_2^+, x_2^-, x_3, x_4, x_5, x_6 >= 0$$