

# Appendix I: ChatGPT Linear Optimisation Problem Prompt & Response

This Appendix includes the prompt supplied to ChatGPT for the linear programming optimisation problem supplied and the response returned by ChatGPT. This exercise was carried out using ChatGPT Plus in June 2023, with access to the Wolfram plug-in.

## Prompt

Solve the following optimisation problem given the objective function and constraint set as follows, where  $x$  and  $y$  are real numbers:

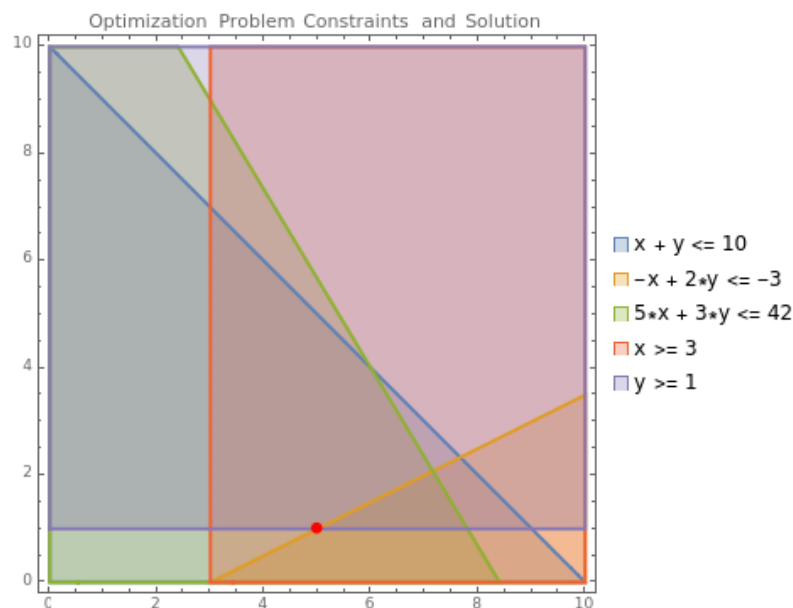
```
\underbrace{\text{minimise}}_{x,y} 4x+7y
x+y\leq 10
-x+2y\leq -3
5x+3y\leq 42
x\geq 3
y\geq 1
```

Produce a graph showing  $x$  on the  $x$ -axis and  $y$  on the  $y$ -axis and showing that the solution obtained is in fact optimal. In the plots, include the constraints. Also report the value of the objective function at the optimal solution.

## Response

The optimal solution to the given optimization problem is  $x = 5$  and  $y = 1$ . The value of the objective function at this optimal solution is 27.

Now, let's plot the constraints and the optimal solution on a graph.



The red point represents the optimal solution ( $x = 5, y = 1$ ). As you can see, this point lies within the feasible region defined by the constraints, indicating that it is indeed an optimal solution. The value of the objective function at this point is 27.