

Linear Programming – Q2a [6 marks](18/6/21)

Exam Boards

OCR : D (Year 1)

MEI: MwA

AQA: D (Year 1)

Edx: D1 (Year 1)

The following Linear Programming problem is to be solved:

$$\text{Minimise } P = 3x + 2y,$$

$$\text{subject to } 5x + 3y \geq 20$$

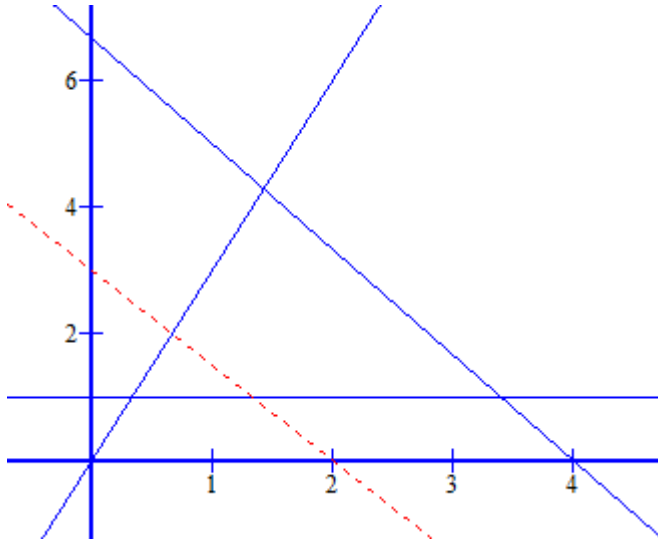
$$y \leq 3x$$

$$x \geq 0, y \geq 1$$

Obtain a solution using a graphical approach. Assume that non-integer solutions are acceptable. [6 marks]

Solution

The diagram shows the constraint lines, as well as the (dotted) line $3x + 2y = 6$, which is parallel to the objective function.



[3 marks]

As the line representing the objective function moves away from the Origin, it first enters the feasible region at the intersection of $5x + 3y = 20$ and $y = 1$; ie at the vertex $(3\frac{2}{5}, 1)$, when

$$P = 3(3.4) + 2(1) = 12.2 \quad [3 \text{ marks}]$$