



QUESTION WORKBOOK

The Simplex algorithm

Decision Mathematics 1 · Year FM

7 questions · 31 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State the stopping condition for the Simplex algorithm, and why it is the right one. [2]

A2 Set up the initial tableau for maximising $P = 4x + 5y$ subject to $x + y \leq 10$ and $2x + 3y \leq 24$. [4]

SECTION B · Standard

B1 Carry out the first iteration, naming the pivot column, the pivot row and the row operations. [6]

- B2** A final tableau has objective row $P + 2s_1 + s_2 = 44$, with rows giving $x = 6$ and $y = 4$. State the solution and justify that it is optimal. [4]

- B3** In a tableau the pivot column entries are 2, -1 and 4, with values 12, 8 and 20. Identify the pivot row and explain the entry you ignored. [3]

SECTION C · Stretch

- C1** Continue from the tableau after the first iteration, with objective row $1, -2/3, 0, 0, 5/3 \mid 40$, s_1 row $0, 1/3, 0, 1, -1/3 \mid 2$ and y row $0, 2/3, 1, 0, 1/3 \mid 8$. Carry out the second iteration and state the solution. [7]

- C2** Explain why a problem with a $\geq$ constraint cannot be started in the ordinary way, and describe the two methods that fix it. [5]
