IEOR 162 – Spring 2022
Graphical Illustrations of LP

Minimize $60x_1 - 10x_2$

subject to $x_1 + x_2 \leq 10$
$40x_1 - 10x_2 \geq 70$
$10x_1 + 5x_2 \geq 40$
$-5x_1 + 10x_2 \geq 0$
$x_1 \geq 0, x_2 \geq 0$

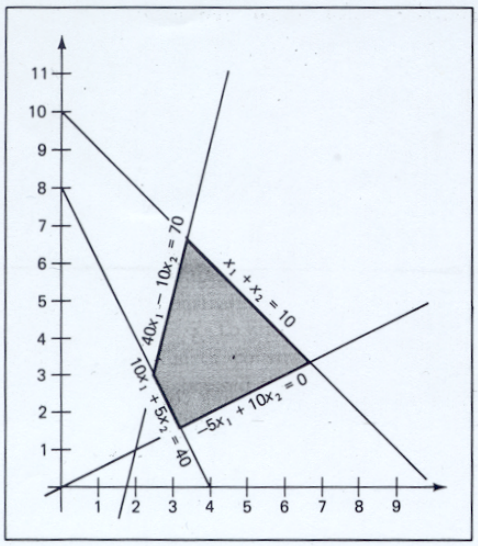


Figure 2.12 Feasible region for Pete Moss's linear program

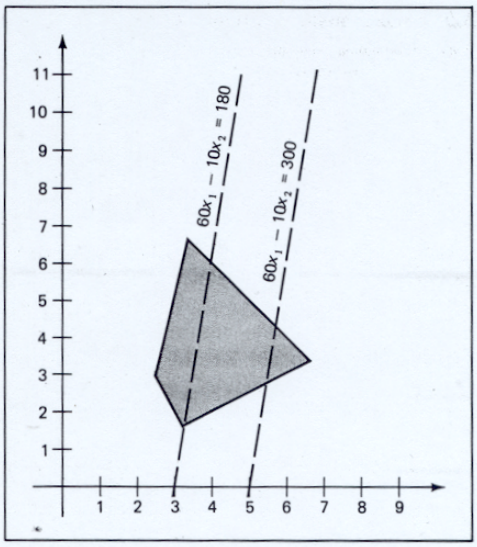


Figure 2.13 Checking for feasible solutions having an objective value of 180 or 300

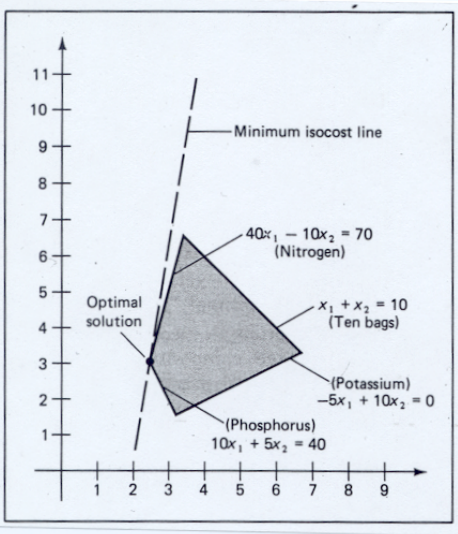
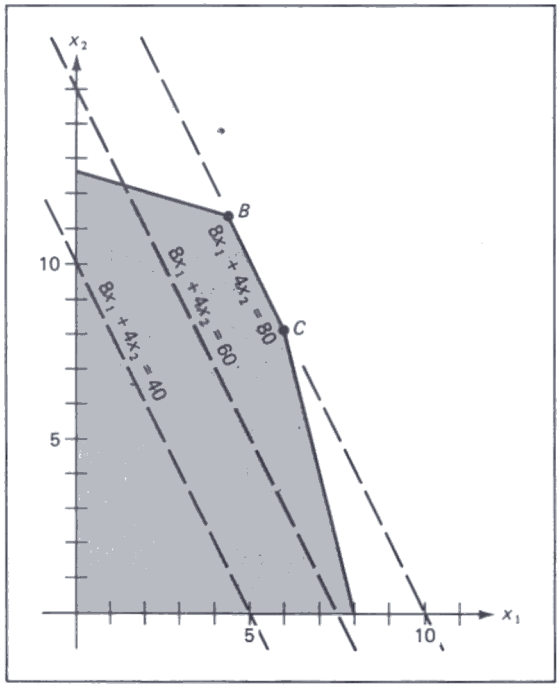


Figure 2.14 Optimal solution of Pete Moss's blending problem

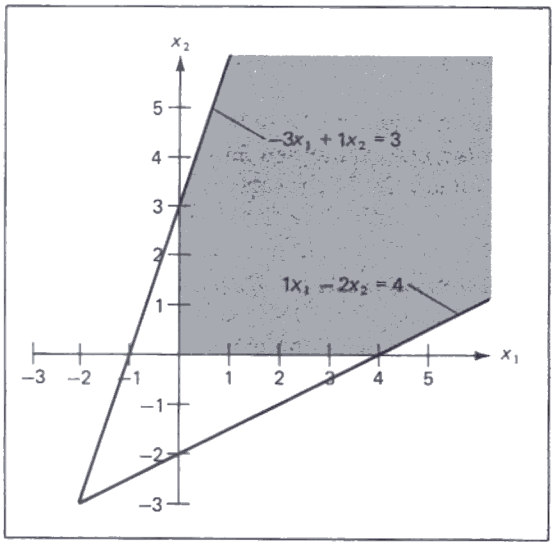
Multiple Optimality

Maximize $8x_1 + 4x_2$
subject to $2x_1 + x_2 \leq 20$
$4x_1 + x_2 \leq 32$
$2x_1 + 7x_2 \leq 88$
$x_1 \geq 0, x_2 \geq 0$



Infeasibility
$X_1 - 2x_2 \geq 4$
$-3x_1 + x_2 \geq 3$
$x_1 \geq 0, x_2 \geq 0$

Unboundedness
$X_1 - 2x_2 \leq 4$
$-3x_1 + x_2 \leq 3$
$x_1 \geq 0, x_2 \geq 0$



Maximize $2x_1 - 8x_2$

subject to $x_1 - 2x_2 \leq 4$
$-3x_1 + x_2 \leq 3$
$x_1 \geq 0, x_2 \geq 0$

Maximize $2x_1 - x_2$

subject to $x_1 - 2x_2 \leq 4$
$-3x_1 + x_2 \leq 3$
$x_1 \geq 0, x_2 \geq 0$

Figure 2.19(a) An optimal solution exists

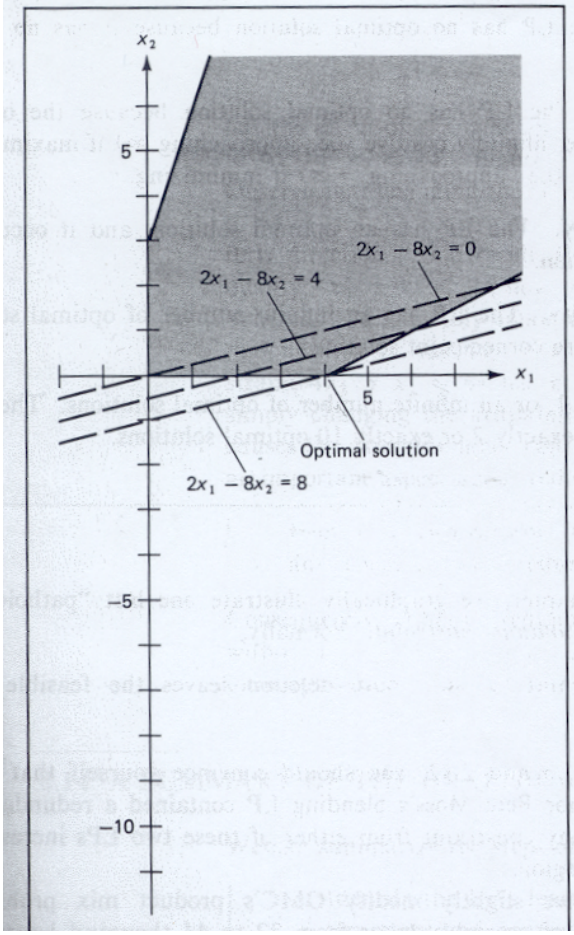
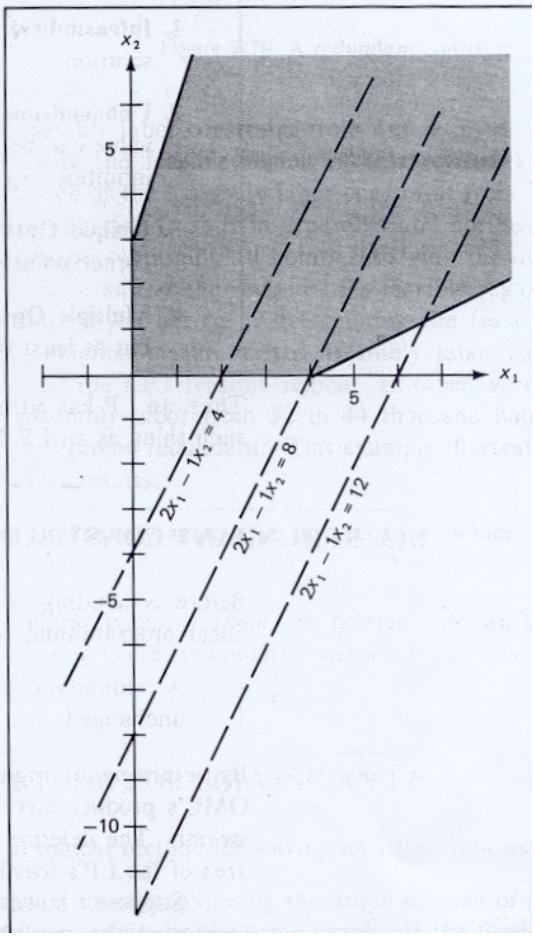


Figure 2.19(b) Unboundedness



Redundant constraint

$2x_1 + 7x_2 \leq 88$
$2x_1 + x_2 \leq 20$
$4x_1 + x_2 \leq 44$
$x_1 \geq 0, x_2 \geq 0$