

9.3.1: Minimization By The Simplex Method (Exercises)

SECTION 9.3 PROBLEM SET: MINIMIZATION BY THE SIMPLEX METHOD

In problems 1-2, convert each minimization problem into a maximization problem, the dual, and then solve by the simplex method.

1)

$$\begin{aligned} \text{Minimize } z &= 6x_1 + 8x_2 \\ \text{subject to } 2x_1 + 3x_2 &\geq 7 \\ 4x_1 + 5x_2 &\geq 9 \\ x_1, x_2 &\geq 0 \end{aligned}$$

2)

$$\begin{aligned} \text{Minimize } z &= 5x_1 + 6x_2 + 7x_3 \\ \text{subject to } 3x_1 + 2x_2 + 3x_3 &\geq 10 \\ 4x_1 + 3x_2 + 5x_3 &\geq 12 \\ x_1, x_2, x_3 &\geq 0 \end{aligned}$$

SECTION 9.3 PROBLEM SET: MINIMIZATION BY THE SIMPLEX METHOD

In problems 3-4, convert each minimization problem into a maximization problem, the dual, and then solve by the simplex method.

3)

$$\begin{aligned} \text{Minimize } z &= 4x_1 + 3x_2 \\ \text{subject to } x_1 + x_2 &\geq 10 \\ 3x_1 + 2x_2 &\geq 24 \\ x_1, x_2 &\geq 0 \end{aligned}$$

4) A diet is to contain at least 8 units of vitamins, 9 units of minerals, and 10 calories. Three foods, Food A, Food B, and Food C are to be purchased. Each unit of Food A provides 1 unit of vitamins, 1 unit of minerals, and 2 calories. Each unit of Food B provides 2 units of vitamins, 1 unit of minerals, and 1 calorie. Each unit of Food C provides 2 units of vitamins, 1 unit of minerals, and 2 calories. If Food A costs \$3 per unit, Food B costs \$2 per unit and Food C costs \$3 per unit, how many units of each food should be purchased to keep costs at a minimum?

This page titled 9.3.1: Minimization By The Simplex Method (Exercises) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [Rupinder Sekhon and Roberta Bloom](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.

- **4.3.1: Minimization By The Simplex Method (Exercises)** by [Rupinder Sekhon and Roberta Bloom](#) is licensed [CC BY 4.0](#). Original source: <https://www.deanza.edu/faculty/bloomroberta/math11/afm3files.html.html>.