

**Solution b**

$$\underline{\underline{A}} := \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 4 & -2 & 2 & 4 & 2 & -6 \\ 2 & 6 & -6 & -2 & 4 & 2 \\ 10 & 4 & -2 & -2 & 4 & 2 \\ -6 & -2 & 4 & 6 & 2 & 6 \\ 8 & 6 & 2 & -12 & -6 & -4 \end{pmatrix} \quad \underline{\underline{b}} := \begin{pmatrix} 12 \\ 60 \\ -45 \\ -9 \\ 48 \\ -81 \end{pmatrix}$$

$$f_{2,1} := \frac{A_{2,1}}{A_{1,1}} = 2 \quad f_{3,1} := \frac{A_{3,1}}{A_{1,1}} = 1 \quad f_{4,1} := \frac{A_{4,1}}{A_{1,1}} = 5 \quad f_{5,1} := \frac{A_{5,1}}{A_{1,1}} = -3 \quad f_{6,1} := \frac{A_{6,1}}{A_{1,1}} = 4$$

$$\underline{\underline{A}} := \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} & A_{1,4} & A_{1,5} & A_{1,6} \\ A_{2,1} - f_{2,1} \cdot A_{1,1} & A_{2,2} - f_{2,1} \cdot A_{1,2} & A_{2,3} - f_{2,1} \cdot A_{1,3} & A_{2,4} - f_{2,1} \cdot A_{1,4} & A_{2,5} - f_{2,1} \cdot A_{1,5} & A_{2,6} - f_{2,1} \cdot A_{1,6} \\ A_{3,1} - f_{3,1} \cdot A_{1,1} & A_{3,2} - f_{3,1} \cdot A_{1,2} & A_{3,3} - f_{3,1} \cdot A_{1,3} & A_{3,4} - f_{3,1} \cdot A_{1,4} & A_{3,5} - f_{3,1} \cdot A_{1,5} & A_{3,6} - f_{3,1} \cdot A_{1,6} \\ A_{4,1} - f_{4,1} \cdot A_{1,1} & A_{4,2} - f_{4,1} \cdot A_{1,2} & A_{4,3} - f_{4,1} \cdot A_{1,3} & A_{4,4} - f_{4,1} \cdot A_{1,4} & A_{4,5} - f_{4,1} \cdot A_{1,5} & A_{4,6} - f_{4,1} \cdot A_{1,6} \\ A_{5,1} - f_{5,1} \cdot A_{1,1} & A_{5,2} - f_{5,1} \cdot A_{1,2} & A_{5,3} - f_{5,1} \cdot A_{1,3} & A_{5,4} - f_{5,1} \cdot A_{1,4} & A_{5,5} - f_{5,1} \cdot A_{1,5} & A_{5,6} - f_{5,1} \cdot A_{1,6} \\ A_{6,1} - f_{6,1} \cdot A_{1,1} & A_{6,2} - f_{6,1} \cdot A_{1,2} & A_{6,3} - f_{6,1} \cdot A_{1,3} & A_{6,4} - f_{6,1} \cdot A_{1,4} & A_{6,5} - f_{6,1} \cdot A_{1,5} & A_{6,6} - f_{6,1} \cdot A_{1,6} \end{pmatrix} \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix} \quad \underline{\underline{b}} := \begin{pmatrix} b_1 \\ b_2 - f_{2,1} \cdot b_1 \\ b_3 - f_{3,1} \cdot b_1 \\ b_4 - f_{4,1} \cdot b_1 \\ b_5 - f_{5,1} \cdot b_1 \\ b_6 - f_{6,1} \cdot b_1 \end{pmatrix}$$

$$\underline{\underline{A}} = \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 0 & -6 & 10 & 0 & -10 & -2 \\ 0 & 4 & -2 & -4 & -2 & 4 \\ 0 & -6 & 18 & -12 & -26 & 12 \\ 0 & 4 & -8 & 12 & 20 & 0 \\ 0 & -2 & 18 & -20 & -30 & 4 \end{pmatrix} \quad \underline{\underline{b}} = \begin{pmatrix} 12 \\ 36 \\ -57 \\ -69 \\ 84 \\ -129 \end{pmatrix}$$

$$f_{3,2} := \frac{A_{3,2}}{A_{2,2}} = -0.667 \quad f_{4,2} := \frac{A_{4,2}}{A_{2,2}} = 1 \quad f_{5,2} := \frac{A_{5,2}}{A_{2,2}} = -0.667 \quad f_{6,2} := \frac{A_{6,2}}{A_{2,2}} = 0.333$$

$$A := \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} & A_{1,4} & A_{1,5} & A_{1,6} \\ A_{2,1} & A_{2,2} & A_{2,3} & A_{2,4} & A_{2,5} & A_{2,6} \\ A_{3,1} & A_{3,2} - f_{3,2} \cdot A_{2,2} & A_{3,3} - f_{3,2} \cdot A_{2,3} & A_{3,4} - f_{3,2} \cdot A_{2,4} & A_{3,5} - f_{3,2} \cdot A_{2,5} & A_{3,6} - f_{3,2} \cdot A_{2,6} \\ A_{4,1} & A_{4,2} - f_{4,2} \cdot A_{2,2} & A_{4,3} - f_{4,2} \cdot A_{2,3} & A_{4,4} - f_{4,2} \cdot A_{2,4} & A_{4,5} - f_{4,2} \cdot A_{2,5} & A_{4,6} - f_{4,2} \cdot A_{2,6} \\ A_{5,1} & A_{5,2} - f_{5,2} \cdot A_{2,2} & A_{5,3} - f_{5,2} \cdot A_{2,3} & A_{5,4} - f_{5,2} \cdot A_{2,4} & A_{5,5} - f_{5,2} \cdot A_{2,5} & A_{5,6} - f_{5,2} \cdot A_{2,6} \\ A_{6,1} & A_{6,2} - f_{6,2} \cdot A_{2,2} & A_{6,3} - f_{6,2} \cdot A_{2,3} & A_{6,4} - f_{6,2} \cdot A_{2,4} & A_{6,5} - f_{6,2} \cdot A_{2,5} & A_{6,6} - f_{6,2} \cdot A_{2,6} \end{pmatrix} \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix} \quad b := \begin{pmatrix} b_1 \\ b_2 \\ b_3 - f_{3,2} \cdot b_2 \\ b_4 - f_{4,2} \cdot b_2 \\ b_5 - f_{5,2} \cdot b_2 \\ b_6 - f_{6,2} \cdot b_2 \end{pmatrix}$$

$$A = \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 0 & -6 & 10 & 0 & -10 & -2 \\ 0 & 0 & 4.667 & -4 & -8.667 & 2.667 \\ 0 & 0 & 8 & -12 & -16 & 14 \\ 0 & 0 & -1.333 & 12 & 13.333 & -1.333 \\ 0 & 0 & 14.667 & -20 & -26.667 & 4.667 \end{pmatrix} \quad b = \begin{pmatrix} 12 \\ 36 \\ -33 \\ -105 \\ 108 \\ -141 \end{pmatrix}$$

$$f_{4,3} := \frac{A_{4,3}}{A_{3,3}} = 1.714 \quad f_{5,3} := \frac{A_{5,3}}{A_{3,3}} = -0.286 \quad f_{6,3} := \frac{A_{6,3}}{A_{3,3}} = 3.143$$

$$A := \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} & A_{1,4} & A_{1,5} & A_{1,6} \\ A_{2,1} & A_{2,2} & A_{2,3} & A_{2,4} & A_{2,5} & A_{2,6} \\ A_{3,1} & A_{3,2} & A_{3,3} & A_{3,4} & A_{3,5} & A_{3,6} \\ A_{4,1} & A_{4,2} & A_{4,3} - f_{4,3} \cdot A_{3,3} & A_{4,4} - f_{4,3} \cdot A_{3,4} & A_{4,5} - f_{4,3} \cdot A_{3,5} & A_{4,6} - f_{4,3} \cdot A_{3,6} \\ A_{5,1} & A_{5,2} & A_{5,3} - f_{5,3} \cdot A_{3,3} & A_{5,4} - f_{5,3} \cdot A_{3,4} & A_{5,5} - f_{5,3} \cdot A_{3,5} & A_{5,6} - f_{5,3} \cdot A_{3,6} \\ A_{6,1} & A_{6,2} & A_{6,3} - f_{6,3} \cdot A_{3,3} & A_{6,4} - f_{6,3} \cdot A_{3,4} & A_{6,5} - f_{6,3} \cdot A_{3,5} & A_{6,6} - f_{6,3} \cdot A_{3,6} \end{pmatrix} \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix} \quad b := \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 - f_{4,3} \cdot b_3 \\ b_5 - f_{5,3} \cdot b_3 \\ b_6 - f_{6,3} \cdot b_3 \end{pmatrix}$$

$$A = \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 0 & -6 & 10 & 0 & -10 & -2 \\ 0 & 0 & 4.667 & -4 & -8.667 & 2.667 \\ 0 & 0 & 0 & -5.143 & -1.143 & 9.429 \\ 0 & 0 & 0 & 10.857 & 10.857 & -0.571 \\ 0 & 0 & 0 & -7.429 & 0.571 & -3.714 \end{pmatrix} \quad b = \begin{pmatrix} 12 \\ 36 \\ -33 \\ -48.429 \\ 98.571 \\ -37.286 \end{pmatrix}$$

$$f_{5,4} := \frac{A_{5,4}}{A_{4,4}} = -2.111$$

$$f_{6,4} := \frac{A_{6,4}}{A_{4,4}} = 1.444$$

$$A := \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} & A_{1,4} & A_{1,5} & A_{1,6} \\ A_{2,1} & A_{2,2} & A_{2,3} & A_{2,4} & A_{2,5} & A_{2,6} \\ A_{3,1} & A_{3,2} & A_{3,3} & A_{3,4} & A_{3,5} & A_{3,6} \\ A_{4,1} & A_{4,2} & A_{4,3} & A_{4,4} & A_{4,5} & A_{4,6} \\ A_{5,1} & A_{5,2} & A_{5,3} & A_{5,4} - f_{5,4} \cdot A_{4,4} & A_{5,5} - f_{5,4} \cdot A_{4,5} & A_{5,6} - f_{5,4} \cdot A_{4,6} \\ A_{6,1} & A_{6,2} & A_{6,3} & A_{6,4} - f_{6,4} \cdot A_{4,4} & A_{6,5} - f_{6,4} \cdot A_{4,5} & A_{6,6} - f_{6,4} \cdot A_{4,6} \end{pmatrix} \quad \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix} \quad b := \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 - f_{5,4} \cdot b_4 \\ b_6 - f_{6,4} \cdot b_4 \end{pmatrix}$$

$$A = \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 0 & -6 & 10 & 0 & -10 & -2 \\ 0 & 0 & 4.667 & -4 & -8.667 & 2.667 \\ 0 & 0 & 0 & -5.143 & -1.143 & 9.429 \\ 0 & 0 & 0 & 0 & 8.444 & 19.333 \\ 0 & 0 & 0 & 0 & 2.222 & -17.333 \end{pmatrix} \quad b = \begin{pmatrix} 12 \\ 36 \\ -33 \\ -48.429 \\ -3.667 \\ 32.667 \end{pmatrix}$$

$$f_{6,5} := \frac{A_{6,5}}{A_{5,5}} = 0.263$$

$$A := \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} & A_{1,4} & A_{1,5} & A_{1,6} \\ A_{2,1} & A_{2,2} & A_{2,3} & A_{2,4} & A_{2,5} & A_{2,6} \\ A_{3,1} & A_{3,2} & A_{3,3} & A_{3,4} & A_{3,5} & A_{3,6} \\ A_{4,1} & A_{4,2} & A_{4,3} & A_{4,4} & A_{4,5} & A_{4,6} \\ A_{5,1} & A_{5,2} & A_{5,3} & A_{5,4} & A_{5,5} & A_{5,6} \\ A_{6,1} & A_{6,2} & A_{6,3} & A_{6,4} & A_{6,5} - f_{6,5} \cdot A_{5,5} & A_{6,6} - f_{6,5} \cdot A_{5,6} \end{pmatrix} \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix}$$

$$b := \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \\ b_6 - f_{6,5} \cdot b_5 \end{pmatrix}$$

$$A = \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 0 & -6 & 10 & 0 & -10 & -2 \\ 0 & 0 & 4.667 & -4 & -8.667 & 2.667 \\ 0 & 0 & 0 & -5.143 & -1.143 & 9.429 \\ 0 & 0 & 0 & 0 & 8.444 & 19.333 \\ 0 & 0 & 0 & 0 & 0 & -22.421 \end{pmatrix} \quad b = \begin{pmatrix} 12 \\ 36 \\ -33 \\ -48.429 \\ -3.667 \\ 33.632 \end{pmatrix}$$

$$T_6 := \frac{b_6}{A_{6,6}} = -1.5$$

$$T_5 := \frac{b_5 - A_{5,6} \cdot T_6}{A_{5,5}} = 3$$

$$T_4 := \frac{b_4 - A_{4,5} \cdot T_5 - A_{4,6} \cdot T_6}{A_{4,4}} = 6$$

$$T_3 := \frac{b_3 - A_{3,4} \cdot T_4 - A_{3,5} \cdot T_5 - A_{3,6} \cdot T_6}{A_{3,3}} = 4.5$$

$$T_2 := \frac{b_2 - A_{2,3} \cdot T_3 - A_{2,4} \cdot T_4 - A_{2,5} \cdot T_5 - A_{2,6} \cdot T_6}{A_{2,2}} = -3$$

$$T_1 := \frac{b_1 - A_{1,2} \cdot T_2 - A_{1,3} \cdot T_3 - A_{1,4} \cdot T_4 - A_{1,5} \cdot T_5 - A_{1,6} \cdot T_6}{A_{1,1}} = 1.5$$

T := T°C

$$T = \begin{pmatrix} 1.5 \\ -3 \\ 4.5 \\ 6 \\ 3 \\ -1.5 \end{pmatrix} \cdot ^\circ\text{C}$$

$$T = \begin{pmatrix} 274.65 \\ 270.15 \\ 277.65 \\ 279.15 \\ 276.15 \\ 271.65 \end{pmatrix} \text{K}$$

**Solution d**

$$A := \begin{pmatrix} 2 & 2 & -4 & 2 & 6 & -2 \\ 4 & -2 & 2 & 4 & 2 & -6 \\ 2 & 6 & -6 & -2 & 4 & 2 \\ 10 & 4 & -2 & -2 & 4 & 2 \\ -6 & -2 & 4 & 6 & 2 & 6 \\ 8 & 6 & 2 & -12 & -6 & -4 \end{pmatrix} \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix}$$

$$b := \begin{pmatrix} 12 \\ 60 \\ -45 \\ -9 \\ 48 \\ -81 \end{pmatrix}$$

$$\underline{T} := (A^{-1} \cdot b) \cdot ^\circ C$$

$$T = \begin{pmatrix} 1.5 \\ -3 \\ 4.5 \\ 6 \\ 3 \\ -1.5 \end{pmatrix} \cdot ^\circ C$$

$$T = \begin{pmatrix} 274.65 \\ 270.15 \\ 277.65 \\ 279.15 \\ 276.15 \\ 271.65 \end{pmatrix} K$$