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Linear Algebra

Topik A Nomor 10

$$M = \begin{matrix} \\ A \\ B \\ C \end{matrix}\begin{matrix} \begin{matrix} P & Q & R \end{matrix} \\ \begin{pmatrix} 2 & 3 & 1 \\ 4 & 2 & 5 \\ 2 & 4 & 2 \end{pmatrix} \end{matrix} \times 200 \text{ unit}$$

$$= \begin{matrix} \\ A \\ B \\ C \end{matrix}\begin{matrix} \begin{matrix} P & Q & R \end{matrix} \\ \begin{pmatrix} 400 & 600 & 200 \\ 800 & 400 & 2000 \\ 400 & 800 & 400 \end{pmatrix} \end{matrix} \times \begin{bmatrix} \$5 \\ \$10 \\ \$5 \end{bmatrix}$$

$$= \begin{matrix} \\ A \\ B \\ C \end{matrix}\begin{pmatrix} \$9000 \\ \$13000 \\ \$12000 \end{pmatrix}$$

Jadi, total biaya produksi untuk menghasilkan 200 unit produk A, B dan C masing-masing $9000, $13000 dan $12000

Topik B Nomor 10

A : $x_1 + 380 = x_2 + 430$

$x_1 - x_2 = 430 - 380$

$x_1 - x_2 = 50$

B : $x_2 + 540 = x_3 + 420$

$x_2 - x_3 = -120$

C : $x_3 + 470 = 420 + 400$

$x_3 = 350$

D : $420 + 450 = x_1 + x_4$

$x_1 + x_4 = 870$

$$\left[\begin{array}{cccc|cccc} 1 & -1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \end{array}\right]$$

$R_4 - R_1 \to R_4$

$$\left[\begin{array}{cccc|cccc} 1 & -1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & -1 & 0 & 0 & 1 \end{array}\right]$$

$R_4 - R_2 \to R_4$

$$\left[\begin{array}{cccc|cccc} 1 & -1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & -1 & -1 & 0 & 1 \end{array}\right]$$

$R_4 - R_3 \to R_3$

$$\left[\begin{array}{cccc|cccc} 1 & -1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & -1 & -1 & -1 & 1 \end{array}\right]$$

$R_2 + R_3 \to R_2$

$$\left[\begin{array}{cccc|cccc} 1 & -1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & -1 & -1 & -1 & 1 \end{array}\right]$$

$R_2 + R_1 \to R_1$

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & -1 & -1 & -1 & 1 \end{array}\right]$$

$$A^{-1}\begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ -1 & -1 & -1 & 1 \end{bmatrix}\begin{bmatrix} 50 \\ -120 \\ 350 \\ 870 \end{bmatrix}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 280 \\ 230 \\ 350 \\ 590 \end{bmatrix}$$

$x_1 = 280 \qquad x_3 = 350$

$x_2 = 230 \qquad x_4 = 590$