

Заданная матрица N1

N1

$$A = \begin{pmatrix} 1 & 1 & -1 \\ -1 & 0 & 2 \\ 2 & 1 & -2 \end{pmatrix}$$

$$D = 4A = \begin{pmatrix} 4 & 4 & -4 \\ -4 & 0 & 8 \\ 8 & 4 & -8 \end{pmatrix}$$

N2

$$D = -2 \begin{pmatrix} 1 & -1 & 0 \\ -2 & 3 & -2 \\ -2 & 3 & -1 \end{pmatrix} + \begin{pmatrix} 1 & -1 & 1 \\ 0 & 1 & 0 \\ -1 & -1 & 0 \end{pmatrix} + 4 \begin{pmatrix} 1 & 1 & -2 \\ 0 & 1 & -1 \\ -2 & -4 & 7 \end{pmatrix} =$$

$$= \begin{pmatrix} -2 & 2 & 0 \\ 4 & -6 & 4 \\ 4 & -6 & 2 \end{pmatrix} + \begin{pmatrix} 1 & -1 & 1 \\ 0 & 1 & 0 \\ -1 & -1 & 0 \end{pmatrix} + \begin{pmatrix} 4 & 4 & -8 \\ 0 & 4 & -4 \\ -8 & -16 & 28 \end{pmatrix} =$$

$$= \begin{pmatrix} 3 & 5 & -7 \\ 4 & -1 & 0 \\ -5 & -23 & 30 \end{pmatrix}$$

N3

$$-4 \begin{pmatrix} 1 & -2 & 4 \\ 0 & 1 & -2 \\ 0 & 2 & 5 \end{pmatrix} - 2X + 8 \begin{pmatrix} 1 & -2 & 1 \\ -2 & 5 & -3 \\ 2 & -5 & 4 \end{pmatrix} = \begin{pmatrix} -2 & 0 & 0 \\ 2 & -2 & 2 \\ 2 & 0 & -2 \end{pmatrix}$$

$$\begin{pmatrix} -4 & 8 & -16 \\ 0 & -4 & 8 \\ 0 & 4 & -8 \end{pmatrix} + \begin{pmatrix} 8 & -16 & 8 \\ -16 & 40 & -24 \\ 16 & -40 & 32 \end{pmatrix} - 2X = \begin{pmatrix} -2 & 0 & 0 \\ 2 & -2 & 2 \\ 2 & 0 & -2 \end{pmatrix} = 2X \cdot \left(\frac{1}{2}\right)$$

$$\begin{pmatrix} -2 & 4 & -8 \\ 0 & -2 & 4 \\ 0 & 4 & -10 \end{pmatrix} + \begin{pmatrix} 4 & -8 & 4 \\ -8 & 20 & -12 \\ 8 & -20 & 10 \end{pmatrix} + \begin{pmatrix} 11 & 0 & 0 \\ -1 & 11 & 1 \\ -1 & 0 & 1 \end{pmatrix} = X$$

$$X = \begin{pmatrix} 3 & -4 & -9 \\ -8 & 19 & -7 \\ 8 & -16 & 7 \end{pmatrix}$$

N4.

$$m \times n \quad A_{m \times n} \cdot B_{n \times l} = C_{m \times l}, \text{ TO } \text{par}$$

$$A_{2 \times 3} \cdot B_{3 \times 3} = C_{2 \times 3}, \text{ TO } m=1, n=3$$

N5.

$$\begin{pmatrix} 2 & 3 \end{pmatrix} \cdot \begin{pmatrix} 1 & -2 & -5 \\ 3 & 0 & -5 \end{pmatrix} \cdot \begin{pmatrix} 1 & -3 \\ 2 & 4 \\ -4 & 4 \end{pmatrix} = \begin{pmatrix} 11 & -4 & -25 \end{pmatrix} \cdot \begin{pmatrix} -1 & 1 \\ 2 & 4 \\ -2 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} -11-7+100 & -33-16-100 \end{pmatrix} = \begin{pmatrix} 81 & -149 \end{pmatrix}$$

N6.

$$A = \begin{pmatrix} -1 & 3 \\ 2 & -3 \end{pmatrix} \quad A^T = \begin{pmatrix} -1 & 2 \\ 3 & -3 \end{pmatrix}$$

N7.

$$\begin{pmatrix} -2 & -2 \\ -1 & -2 \end{pmatrix}^2 = \begin{pmatrix} 6 & 8 \\ 4 & 6 \end{pmatrix}$$

N8.

$$\begin{pmatrix} 14 & 1 \\ 0 & 14 \end{pmatrix}^3 = \begin{pmatrix} 14^2 & 2 \cdot 14 \\ 0 & 14 \end{pmatrix} \cdot \begin{pmatrix} 14 & 1 \\ 0 & 14 \end{pmatrix}^2$$

$$= \begin{pmatrix} 14^3 & 3 \cdot 14^2 \\ 0 & 14^2 \end{pmatrix} \cdot \begin{pmatrix} 14 & 1 \\ 0 & 14 \end{pmatrix} = \begin{pmatrix} 14^4 & 7 \cdot 14^3 \\ 0 & 14^3 \end{pmatrix}$$

$$\left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 3 & 12 & 16 & 20 & 24 & 1 \\ -12 & -12 & -17 & -61 & -75 & 5 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 24 & 84 & 84 & 72 & 111 & 0 \end{array} \right) \xrightarrow{R_2 \leftrightarrow R_1} \left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 0 & 6 & 7 & 8 & 9 & 1 \\ 0 & -12 & -17 & -61 & -75 & 5 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 0 & 0 & -10 & -50 & -39 & 0 \end{array} \right)$$

$$\left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 0 & 6 & 7 & 8 & 9 & 1 \\ 0 & -12 & -17 & -61 & -75 & 5 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 0 & 0 & -10 & -50 & -39 & 0 \end{array} \right) \xrightarrow{R_2 \leftrightarrow R_3} \left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 0 & 6 & 7 & 8 & 9 & 1 \\ 0 & -12 & -17 & -61 & -75 & 5 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 0 & 0 & -10 & -50 & -39 & 0 \end{array} \right)$$

$$\left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 0 & 6 & 7 & 8 & 9 & 1 \\ 0 & 0 & 10 & 11 & 12 & 0 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 0 & 0 & 0 & -38 & -28 & 0 \end{array} \right) \xrightarrow{R_4 \leftrightarrow R_3} \left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 5 & (-3) \\ 0 & 6 & 7 & 8 & 9 & 1 \\ 0 & 0 & 10 & 11 & 12 & 0 \\ 0 & 0 & 0 & 13 & 14 & 0 \\ 0 & 0 & 0 & 0 & 15 & 0 \end{array} \right)$$