

$$\textcircled{2} A \cdot X \cdot C = B; X = ?$$

Вариант АА.
УРБТ 1-2-3; 03.7

$$A = \begin{pmatrix} 2 & 3 \\ 2 & 2 \end{pmatrix}; B = \begin{pmatrix} 2 & -2 \\ 5 & -4 \end{pmatrix}; C = \begin{pmatrix} -2 & 2 \\ 2 & 2 \end{pmatrix}$$

$$X = A^{-1} \cdot B \cdot C^{-1}$$

$$\Delta A = -2 \neq 0 \Rightarrow \exists A^{-1}; \Delta C = -8 \neq 0 \Rightarrow \exists C^{-1}$$

$$\tilde{A} = \begin{pmatrix} 2 & -3 \\ -2 & 2 \end{pmatrix}; \tilde{C} = \begin{pmatrix} 2 & -2 \\ -2 & -2 \end{pmatrix}$$

$$A^{-1} = \frac{1}{-2} \cdot \tilde{A} = \begin{pmatrix} -1 & \frac{3}{2} \\ 1 & -1 \end{pmatrix}; C^{-1} = \frac{1}{-8} \cdot \tilde{C} = \begin{pmatrix} -\frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix}$$

$$X = A^{-1} \cdot B \cdot C^{-1} = \begin{pmatrix} -1 & \frac{3}{2} \\ 1 & -1 \end{pmatrix} \cdot \begin{pmatrix} 2 & -2 \\ 5 & -4 \end{pmatrix} \cdot \begin{pmatrix} -\frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} =$$

$$= \begin{pmatrix} (-1) \cdot 2 + \frac{3}{2} \cdot 5 & (-1) \cdot (-2) + \frac{3}{2} \cdot (-4) \\ 1 \cdot 2 + (-1) \cdot 5 & 1 \cdot (-2) + (-1) \cdot (-4) \end{pmatrix} \cdot \begin{pmatrix} -\frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} =$$

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

$$= \begin{pmatrix} \frac{11}{2} \cdot (-\frac{1}{4}) + (-4) \cdot \frac{1}{4} & \frac{11}{2} \cdot \frac{1}{4} + (-4) \cdot \frac{1}{4} \\ (-3) \cdot (-\frac{1}{4}) + 2 \cdot \frac{1}{4} & (-3) \cdot \frac{1}{4} + 2 \cdot \frac{1}{4} \end{pmatrix} =$$

$$= \begin{pmatrix} \frac{11}{2} \cdot (-\frac{1}{4}) + (-4) \cdot \frac{1}{4} & \frac{11}{2} \cdot \frac{1}{4} + (-4) \cdot \frac{1}{4} \\ (-3) \cdot (-\frac{1}{4}) + 2 \cdot \frac{1}{4} & (-3) \cdot \frac{1}{4} + 2 \cdot \frac{1}{4} \end{pmatrix} =$$

$$= \begin{pmatrix} -\frac{19}{8} & \frac{3}{8} \\ \frac{5}{4} & -\frac{1}{4} \end{pmatrix}$$

$$\textcircled{5} \quad \vec{a} = 2\vec{i} + 3\vec{j}; \quad \vec{b} = -3\vec{i} + \vec{j} - 2\vec{k}$$

$$\vec{c} = 2\vec{i} + 2\vec{j} - \vec{k}$$

$$\begin{aligned} 2) \quad 3\vec{a} + \vec{c} - \frac{1}{4}\vec{b} &= 3(2; 3; 0) + \\ &+ (2; 2; -1) - \frac{1}{4}(-3; 1; -2) = \\ &= (6; 9; 0) + (2; 2; -1) - \left(-\frac{3}{4}; \frac{1}{4}; -\frac{1}{2}\right) = \\ &= (8; 11; -1) + (0,75; -0,25; 0,5) = \\ &= \underline{(8,75; 10,75; -0,5)} \end{aligned}$$

$$\begin{aligned} 3) \quad \vec{a} - 3\vec{b} + 4\vec{c} &= (2; 3; 0) - 3(-3; 1; -2) + \\ &+ 4(2; 2; -1) = (2; 3; 0) - (-9; 3; -6) + \\ &+ (8; 8; -4) = (11; 0; 6) + (8; 8; -4) = \\ &= \underline{(19; 8; 2) \iff 19\vec{i} + 8\vec{j} + 2\vec{k}} \end{aligned}$$