

ДОМАШНА РАБОТА №3

1) Пресметнете детерминантите:

$$1.1. \begin{vmatrix} -2 & 3 \\ -1 & 4 \end{vmatrix}; \quad 1.2. \begin{vmatrix} 5 & -3 \\ -1 & -4 \end{vmatrix}; \quad 1.3. \begin{vmatrix} 6 & -3 \\ 5 & -2 \end{vmatrix}; \quad 1.4. \begin{vmatrix} -7 & -3 \\ -1 & -2 \end{vmatrix}; \quad 1.5. \begin{vmatrix} 0 & -3 \\ -1 & 10 \end{vmatrix};$$

$$1.6. \begin{vmatrix} -2 & -4 \\ -2 & 0 \end{vmatrix}; \quad 1.7. \begin{vmatrix} 5 & -3 \\ 2 & 6 \end{vmatrix}; \quad 1.8. \begin{vmatrix} 0 & -3 \\ 1 & 40 \end{vmatrix}; \quad 1.9. \begin{vmatrix} -3 & 3 \\ -6 & 5 \end{vmatrix}; \quad 1.10. \begin{vmatrix} 4 & 8 \\ -1 & -4 \end{vmatrix}.$$

2) Пресметнете детерминантите:

$$2.1. \begin{vmatrix} -3 & 2 & -1 \\ 4 & 3 & -2 \\ 0 & -1 & 3 \end{vmatrix}; \quad 2.2. \begin{vmatrix} -2 & 0 & 1 \\ 3 & -2 & -1 \\ -2 & 1 & 3 \end{vmatrix}; \quad 2.3. \begin{vmatrix} 3 & -1 & -4 \\ -2 & 0 & -5 \\ -1 & 2 & 4 \end{vmatrix}; \quad 2.4. \begin{vmatrix} 5 & -1 & -3 \\ 0 & 2 & 4 \\ -1 & 2 & -1 \end{vmatrix};$$

$$2.5. \begin{vmatrix} -4 & 2 & -1 \\ 3 & 2 & 0 \\ -1 & -2 & -3 \end{vmatrix}; \quad 2.6. \begin{vmatrix} -1 & 2 & 5 \\ -3 & -1 & -2 \\ 1 & 2 & -2 \end{vmatrix}; \quad 2.7. \begin{vmatrix} 3 & -2 & 4 \\ -1 & 2 & -1 \\ 2 & 0 & -3 \end{vmatrix}; \quad 2.8. \begin{vmatrix} -2 & 1 & -5 \\ 3 & 2 & 0 \\ -1 & -1 & -2 \end{vmatrix};$$

$$2.9. \begin{vmatrix} 3 & -2 & -1 \\ -2 & -3 & -1 \\ 0 & -5 & 1 \end{vmatrix}; \quad 2.10. \begin{vmatrix} -5 & 1 & -2 \\ 3 & -2 & 0 \\ 2 & -1 & -2 \end{vmatrix}.$$

3) Пресметнете детерминантите:

$$3.1. \begin{vmatrix} -2 & 0 & 0 & 3 \\ 2 & -1 & -3 & 4 \\ 2 & 0 & -1 & 3 \\ 3 & 2 & -1 & -4 \end{vmatrix}; \quad 3.2. \begin{vmatrix} -2 & 0 & 1 & -3 \\ 2 & -1 & -2 & 1 \\ 3 & -2 & 2 & -1 \\ 5 & 0 & 0 & -2 \end{vmatrix}; \quad 3.3. \begin{vmatrix} -3 & 1 & -2 & 2 \\ 0 & -1 & -2 & 0 \\ 0 & 3 & 2 & -1 \\ 2 & -1 & 1 & -3 \end{vmatrix};$$

$$3.4. \begin{vmatrix} 3 & -2 & -1 & 0 \\ 2 & 1 & 2 & -3 \\ 0 & -1 & -2 & 0 \\ -2 & 1 & 1 & 3 \end{vmatrix}; \quad 3.5. \begin{vmatrix} -2 & 1 & 3 & 2 \\ -1 & 2 & 0 & -1 \\ -3 & 2 & 0 & 0 \\ -1 & -2 & -2 & 1 \end{vmatrix}; \quad 3.6. \begin{vmatrix} -3 & -2 & 1 & -1 \\ -2 & 0 & 0 & -3 \\ 2 & -1 & -2 & 1 \\ 3 & -2 & 0 & 5 \end{vmatrix};$$

$$3.7. \begin{vmatrix} 2 & -1 & 2 & -1 \\ 0 & -3 & 0 & -1 \\ -1 & 3 & -4 & 2 \\ 2 & -1 & 0 & 2 \end{vmatrix}; \quad 3.8. \begin{vmatrix} -2 & 0 & -1 & 0 \\ 3 & 1 & 2 & 1 \\ 1 & -2 & 3 & -1 \\ 2 & 0 & -1 & -2 \end{vmatrix}; \quad 3.9. \begin{vmatrix} -2 & -3 & -1 & -2 \\ 2 & -1 & 3 & 0 \\ 2 & -1 & -2 & 3 \\ 0 & 2 & -1 & 0 \end{vmatrix};$$

$$3.10. \begin{vmatrix} 4 & -1 & 2 & -3 \\ -2 & 0 & -3 & 1 \\ 2 & 0 & -1 & 1 \\ 1 & -3 & 2 & -2 \end{vmatrix}.$$

4) Пресметнете детерминантите:

$$4.1. \begin{vmatrix} 2 & -3 & -1 & 2 \\ 1 & -2 & 3 & -1 \\ 2 & -2 & -3 & 2 \\ -2 & 1 & 3 & -1 \end{vmatrix}; \quad 4.2. \begin{vmatrix} -1 & 2 & 3 & -2 \\ 2 & 2 & -2 & -2 \\ 3 & -6 & 3 & -3 \\ -2 & 1 & -2 & -1 \end{vmatrix}; \quad 4.3. \begin{vmatrix} -3 & 1 & -2 & 2 \\ 3 & -2 & 1 & -3 \\ -6 & -1 & 2 & -1 \\ 9 & -2 & -1 & 1 \end{vmatrix};$$

$$4.4. \begin{vmatrix} 2 & 4 & 6 & 8 \\ -1 & 1 & 2 & -3 \\ -2 & -1 & 3 & 1 \\ 3 & -1 & 2 & 1 \end{vmatrix}; \quad 4.5. \begin{vmatrix} -2 & -1 & 1 & 1 \\ 2 & 4 & -6 & -8 \\ 3 & 1 & -2 & -1 \\ 1 & -2 & 4 & -2 \end{vmatrix}; \quad 4.6. \begin{vmatrix} 5 & 10 & -5 & 5 \\ 2 & -1 & 3 & 1 \\ -3 & 2 & 2 & -3 \\ 2 & 1 & 2 & -1 \end{vmatrix};$$

$$4.7. \begin{vmatrix} -2 & -3 & 4 & 2 \\ -1 & 2 & 2 & 3 \\ 2 & -1 & 6 & -1 \\ 2 & 1 & -2 & -1 \end{vmatrix}; \quad 4.8. \begin{vmatrix} 3 & -1 & 2 & -1 \\ 2 & -3 & 2 & -2 \\ -1 & 1 & -2 & 3 \\ -2 & 2 & 4 & -2 \end{vmatrix}; \quad 4.9. \begin{vmatrix} -1 & -2 & -3 & 4 \\ 2 & 3 & 1 & 2 \\ -3 & 1 & 2 & -2 \\ 2 & -2 & 3 & 6 \end{vmatrix};$$

$$4.10. \begin{vmatrix} -2 & -4 & -6 & 8 \\ 3 & 2 & 1 & -1 \\ -1 & -2 & 3 & 1 \\ -1 & -6 & 1 & -1 \end{vmatrix}.$$

5) Решете с формулите на Крамер системите:

$$5.1. \begin{cases} x + y + z = 3 \\ x - 2y + 4z = 18 \\ -2x + y + 5z = 9 \end{cases}; \quad 5.2. \begin{cases} x_1 + x_2 + x_3 = 2 \\ 2x_1 - x_2 - x_3 = 1 \\ 3x_1 - x_2 + 2x_3 = -4 \end{cases}; \quad 5.3. \begin{cases} 2x + 2y - 3z = -3 \\ 4x + y + 4z = -2 \\ x + 2y - z = 1 \end{cases};$$

$$5.4. \begin{cases} 3x - y - z = -1 \\ -2x + 3y + z = 0 \\ x + 2y - z = 1 \end{cases}; \quad 5.5. \begin{cases} 2x + y - z = 3 \\ 3x - 2y - z = 4 \\ x + y + z = 0 \end{cases}; \quad 5.6. \begin{cases} 2x - y - z = -5 \\ x + 2y + 3z = 0 \\ -x + y + 4z = 3 \end{cases};$$

$$5.7. \begin{cases} 2x - y + 2z = 1 \\ -3x + 2y - z = 5 \\ x - y + 2z = 3 \end{cases}; \quad 5.8. \begin{cases} x + y + z = 3 \\ x - 2y + 4z = 18 \\ -2x + y + 5z = 9 \end{cases}; \quad 5.9. \begin{cases} 2x + y - z = 0 \\ 3x - 2y - 2z = -1 \\ x + y - 3z = -5 \end{cases};$$

$$5.10. \begin{cases} 3x - y - z = -1 \\ -2x + 3y + z = 0 \\ x + 2y - z = 1 \end{cases}$$

б) Дадени са матриците:

$$6.1. A = \begin{pmatrix} 2 & 3 \\ -1 & 4 \end{pmatrix} \text{ и } B = \begin{pmatrix} 3 & -4 \\ 2 & -1 \end{pmatrix};$$

$$6.2. A = \begin{pmatrix} 5 & 2 \\ -3 & 4 \end{pmatrix} \text{ и } B = \begin{pmatrix} -3 & -4 \\ 5 & 3 \end{pmatrix};$$

$$6.3. A = \begin{pmatrix} 3 & 1 \\ -2 & 4 \end{pmatrix} \text{ и } B = \begin{pmatrix} -2 & -1 \\ 3 & 5 \end{pmatrix};$$

$$6.4. A = \begin{pmatrix} -1 & 0 \\ 2 & 3 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & -1 \\ 3 & -2 \end{pmatrix};$$

$$6.5. A = \begin{pmatrix} -2 & 5 \\ 4 & 3 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & -3 \\ 2 & 5 \end{pmatrix};$$

$$6.6. A = \begin{pmatrix} -4 & 5 \\ -2 & 2 \end{pmatrix} \text{ и } B = \begin{pmatrix} -3 & -1 \\ 2 & -3 \end{pmatrix};$$

$$6.7. A = \begin{pmatrix} 2 & -1 \\ -3 & 4 \end{pmatrix} \text{ и } B = \begin{pmatrix} 0 & -2 \\ 3 & 1 \end{pmatrix};$$

$$6.8. A = \begin{pmatrix} -2 & -1 \\ 0 & 3 \end{pmatrix} \text{ и } B = \begin{pmatrix} 1 & -3 \\ 2 & 4 \end{pmatrix};$$

$$6.9. A = \begin{pmatrix} -5 & 4 \\ 1 & 0 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & -2 \\ -3 & -4 \end{pmatrix};$$

$$6.10. A = \begin{pmatrix} -2 & -1 \\ 0 & 3 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & 3 \\ -2 & 4 \end{pmatrix};$$

Пресметнете: $AB - BA = ?$, $(2A - B)(A + 3B) = ?$, $(A - 2B)(3A + B) = ?$,

$A^{-1} \cdot B^t = ?$, $B^t \cdot A = ?$, $(A \cdot B^t)^{-1} = ?$, $A^{-1} B = ?$, $B^t \cdot A^{-1} = ?$, $A^t \cdot B^{-1} = ?$.

7) Дадени са матриците:

$$7.1. A = \begin{pmatrix} -2 & 1 & 0 \\ 3 & -1 & 2 \end{pmatrix} \text{ и } B = \begin{pmatrix} 2 & -1 & 3 \\ 0 & -2 & 4 \end{pmatrix};$$

$$7.2. A = \begin{pmatrix} -3 & -1 & 2 \\ 2 & 0 & 3 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & -2 & 3 \\ 1 & -3 & -2 \end{pmatrix};$$

$$7.3. A = \begin{pmatrix} -3 & 1 & -2 \\ 0 & 2 & 5 \end{pmatrix} \text{ и } B = \begin{pmatrix} 3 & -1 & 2 \\ 2 & 1 & -3 \end{pmatrix};$$

$$7.4. A = \begin{pmatrix} 2 & -1 & 1 \\ 5 & -2 & -1 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & 3 & 2 \\ 4 & -2 & 1 \end{pmatrix};$$

$$7.5. A = \begin{pmatrix} -3 & -2 & -1 \\ 2 & 3 & 5 \end{pmatrix} \text{ и } B = \begin{pmatrix} -1 & 0 & 2 \\ -3 & -2 & -1 \end{pmatrix};$$

$$7.6. A = \begin{pmatrix} 3 & 0 & -2 \\ 1 & 2 & -5 \end{pmatrix} \text{ и } B = \begin{pmatrix} 2 & -3 & -1 \\ 5 & -3 & 2 \end{pmatrix};$$

$$7.7. A = \begin{pmatrix} 4 & -2 & 2 \\ 3 & -1 & 2 \end{pmatrix} \text{ и } B = \begin{pmatrix} 2 & -3 & -1 \\ 2 & 2 & -2 \end{pmatrix};$$

$$7.8. A = \begin{pmatrix} -3 & -2 & 0 \\ 1 & 2 & -2 \end{pmatrix} \text{ и } B = \begin{pmatrix} -2 & -1 & 3 \\ -4 & 5 & 2 \end{pmatrix};$$

$$7.9. A = \begin{pmatrix} 2 & -3 & -1 \\ 2 & 3 & -4 \end{pmatrix} \text{ и } B = \begin{pmatrix} 2 & -1 & -3 \\ 3 & -5 & -5 \end{pmatrix};$$

$$7.10. A = \begin{pmatrix} 3 & 0 & 5 \\ -2 & -1 & -4 \end{pmatrix} \text{ и } B = \begin{pmatrix} 0 & 1 & -2 \\ -3 & 2 & -5 \end{pmatrix}.$$

Пресметнете: AB^t , $A^t \cdot B$, BA^t , $B^t \cdot A$, AA^t , $A^t \cdot A$, BB^t , $B^t \cdot B$, $(A \cdot B^t)^{-1}$, $(B \cdot A^t)^{-1}$, $(A \cdot A^t)^{-1}$, $(B \cdot B^t)^{-1}$.

8) Намерете обратната матрица на матриците:

$$8.1. A = \begin{pmatrix} -2 & 3 & 1 \\ -1 & 0 & -2 \\ -3 & -1 & 2 \end{pmatrix}; \quad 8.2. A = \begin{pmatrix} -4 & 3 & 1 \\ -1 & -6 & 0 \\ -2 & -8 & -1 \end{pmatrix}; \quad 8.3. A = \begin{pmatrix} 2 & -3 & 1 \\ -2 & 6 & -4 \\ -5 & 4 & 0 \end{pmatrix};$$

$$8.4. A = \begin{pmatrix} -3 & 2 & -4 \\ -1 & 0 & -2 \\ 6 & 2 & -1 \end{pmatrix}; \quad 8.5. A = \begin{pmatrix} -3 & -2 & 1 \\ 2 & 3 & 0 \\ -4 & 2 & -1 \end{pmatrix}; \quad 8.6. A = \begin{pmatrix} -3 & -5 & 0 \\ 2 & 3 & 1 \\ -1 & -4 & -2 \end{pmatrix};$$

$$8.7. A = \begin{pmatrix} 5 & -2 & -1 \\ 3 & 0 & 2 \\ -1 & -4 & -1 \end{pmatrix}; \quad 8.8. A = \begin{pmatrix} 2 & 4 & -3 \\ -1 & 2 & -5 \\ 3 & -1 & -2 \end{pmatrix}; \quad 8.9. A = \begin{pmatrix} -2 & 4 & -1 \\ 3 & 2 & -1 \\ -1 & 2 & -5 \end{pmatrix};$$

$$8.10. A = \begin{pmatrix} 3 & -2 & -1 \\ 4 & 3 & -2 \\ 5 & -2 & -1 \end{pmatrix}.$$

9) Дадени са матриците:

$$9.1. A = \begin{pmatrix} -4 & 6 & 1 \\ -1 & 0 & -2 \\ -2 & -1 & 2 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & x & . \\ . & . & y \\ z & . & . \end{pmatrix}; \quad 9.2. A = \begin{pmatrix} -3 & 2 & -1 \\ 2 & 1 & 0 \\ -3 & -1 & -2 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & . & y \\ x & . & . \\ . & z & . \end{pmatrix};$$

$$9.3. A = \begin{pmatrix} 4 & -2 & 3 \\ 1 & -1 & 2 \\ -2 & 1 & -3 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & x & . \\ y & . & . \\ . & . & z \end{pmatrix}; \quad 9.4. A = \begin{pmatrix} 5 & -1 & 4 \\ -2 & 1 & -3 \\ 2 & -3 & 1 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & . & x \\ y & . & . \\ . & z & . \end{pmatrix}$$

$$9.5. A = \begin{pmatrix} 4 & -2 & -1 \\ 2 & 3 & -2 \\ 0 & -1 & 3 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & x & . \\ . & . & y \\ . & . & z \end{pmatrix}; \quad 9.6. A = \begin{pmatrix} 5 & -2 & -1 \\ 2 & -1 & 3 \\ 2 & -2 & 0 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} x & . & . \\ . & . & y \\ . & z & . \end{pmatrix}$$

$$9.7. A = \begin{pmatrix} -3 & -2 & 4 \\ 1 & 2 & -2 \\ 1 & 5 & 0 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & y & . \\ x & . & z \\ . & . & . \end{pmatrix}; \quad 9.8. A = \begin{pmatrix} 4 & -2 & 4 \\ 6 & -2 & 4 \\ -8 & -6 & 2 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & . & y \\ . & x & . \\ z & . & . \end{pmatrix}$$

$$9.9. A = \begin{pmatrix} 3 & -1 & 2 \\ 2 & -4 & -3 \\ -1 & 2 & 5 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} . & y & z \\ x & . & . \\ . & . & . \end{pmatrix}; \quad 9.10. A = \begin{pmatrix} 2 & -1 & -3 \\ 6 & -1 & 1 \\ 1 & 2 & -2 \end{pmatrix} \quad A^{-1} = \begin{pmatrix} x & . & . \\ y & . & z \\ . & . & . \end{pmatrix}$$

Намерете: x , y и z .

10) Решете по метода на Гаус системите:

$$10.1. \begin{cases} 3x - 4y - z = -2 \\ x + y + 2z = 4 \\ 2x + y - 3z = 0 \\ 3x + 2y - z = 4 \end{cases};$$

$$10.2. \begin{cases} 2x + 3y + z = 6 \\ x + 2y - z = 2 \\ 4x + 7y - z = 10 \\ 5x + 9y - 2z = 12 \end{cases};$$

$$10.3. \begin{cases} x + y + 3z = 0 \\ -2x + 3y + z = 5 \\ 3x + 2y - 4z = -1 \\ 4x + 3y - z = -1 \end{cases};$$

$$10.4. \begin{cases} x - 2y + z = 0 \\ 3x - 5y + 3z = 1 \\ -2x + 3y - 2z = -1 \\ 5x - 9y + 5z = 1 \end{cases};$$

$$10.5. \begin{cases} -x + y + z = 0 \\ 2x - 3y - 2z = 1 \\ 3x + 2y - z = 1 \\ 5x - y - 3z = 2 \end{cases};$$

$$10.6. \begin{cases} x - y - z = -1 \\ 3x - 2y + 4z = 5 \\ 4x - 3y + 3z = 4 \\ 7x - 5y + 7z = 9 \end{cases};$$

$$10.7. \begin{cases} 3x + y - 2z = 0 \\ 2x + 4y - 7z = -1 \\ x - 3y + 5z = 1 \\ -2x + 5y - 9z = 1 \end{cases};$$

$$10.8. \begin{cases} x + y + z = 3 \\ -2x - 3y + z = -4 \\ -x - 2y + 2z = -1 \\ 3x + 5y - 3z = -3 \end{cases};$$

$$10.9. \begin{cases} x + y + z = 0 \\ 3x + 4y + 3z = -1 \\ -2x - 3y - 2z = 1 \\ 4x - 4y - z = -2 \end{cases};$$

$$10.10. \begin{cases} 3x + 4y + z = 7 \\ x + y - 5z = -3 \\ 2x + 3y + 6z = 10 \\ 4x + 5y - 4z = 0 \end{cases};$$