

Контрольное домашнее задание.
Часть 1. Алгебра.

Срок сдачи – до начала сессии

Задание 1. Даны матрицы A , B , C . Найти $2A - 3B$, $A \cdot B$, $A \cdot C$.

$$1.1. \quad A = \begin{pmatrix} 2 & 3 & 1 \\ 3 & 1 & 4 \\ 2 & 1 & -1 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & 2 & -1 \\ 1 & 3 & 2 \\ 2 & 1 & -1 \end{pmatrix}, \quad C = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}.$$

$$1.2. \quad A = \begin{pmatrix} 1 & 4 & 2 \\ 2 & 3 & 1 \\ -4 & -7 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & 1 & 4 \\ 1 & 2 & 3 \\ 1 & -4 & -7 \end{pmatrix}, \quad C = \begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}.$$

$$1.3. \quad A = \begin{pmatrix} -2 & 1 & 2 \\ 1 & 3 & 1 \\ -7 & -4 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & -2 & 2 \\ 0 & 1 & 3 \\ 4 & -7 & -4 \end{pmatrix}, \quad C = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}.$$

$$1.4. \quad A = \begin{pmatrix} 2 & 1 & 5 \\ -4 & 3 & -4 \\ 1 & -1 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & -1 & 4 \\ -4 & -2 & 1 \\ 2 & 1 & 0 \end{pmatrix}, \quad C = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}.$$

$$1.5. \quad A = \begin{pmatrix} 2 & 1 & 0 \\ 1 & 4 & 2 \\ -4 & 1 & 7 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & -1 & 4 \\ 1 & 3 & -4 \\ 0 & 2 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} -3 \\ 2 \\ 4 \end{pmatrix}.$$

$$1.6. \quad A = \begin{pmatrix} 2 & -4 & 3 \\ 1 & -2 & 1 \\ 0 & 1 & -1 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & -4 & 2 \\ 0 & 3 & 1 \\ 4 & -7 & 5 \end{pmatrix}, \quad C = \begin{pmatrix} -2 \\ 1 \\ 2 \end{pmatrix}.$$

$$1.7. \quad A = \begin{pmatrix} 4 & 3 & 1 \\ 2 & 1 & 4 \\ 1 & 1 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & 3 & 0 \\ 1 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} 4 \\ 3 \\ 1 \end{pmatrix}.$$

$$1.8. \quad A = \begin{pmatrix} -1 & 2 & -1 \\ 4 & 3 & 7 \\ 1 & 2 & -4 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 2 & -4 \\ 3 & 1 & 1 \\ 1 & 3 & -7 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ -1 \\ 2 \end{pmatrix}.$$

$$1.9. \quad A = \begin{pmatrix} 2 & 3 & -4 \\ 3 & 2 & -4 \\ -1 & -1 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & 2 & 1 \\ 3 & 1 & -7 \\ 2 & 2 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} -3 \\ 2 \\ 5 \end{pmatrix}.$$

$$1.10. \quad A = \begin{pmatrix} 5 & 2 & 4 \\ 5 & 2 & 4 \\ -4 & 3 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & -7 & 1 \\ 15 & 3 & -1 \\ 3 & 2 & 4 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ 4 \\ 5 \end{pmatrix}.$$

$$1.11. \quad A = \begin{pmatrix} 3 & -5 & 4 \\ 3 & 2 & -3 \\ 2 & -1 & 1 \end{pmatrix}, \quad B = \begin{pmatrix} -1 & -3 & -2 \\ 1 & 2 & 1 \\ -2 & 1 & 3 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ -1 \\ 4 \end{pmatrix}.$$

$$1.12. \quad A = \begin{pmatrix} -2 & -4 & 2 \\ 1 & 3 & -1 \\ 3 & 6 & -2 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & 1 & -2 \\ 4 & -2 & 3 \\ -2 & 4 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} 5 \\ 3 \\ -2 \end{pmatrix}.$$

$$1.13. \quad A = \begin{pmatrix} 2 & 1 & 2 \\ -1 & 4 & 2 \\ -5 & 2 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} -3 & -2 & 3 \\ -1 & 3 & -2 \\ -4 & 6 & -5 \end{pmatrix}, \quad C = \begin{pmatrix} 1 \\ 2 \\ -5 \end{pmatrix}.$$

$$1.14. \quad A = \begin{pmatrix} 4 & -1 & -3 \\ -1 & 3 & -2 \\ 1 & 2 & -4 \end{pmatrix}, \quad B = \begin{pmatrix} -3 & 1 & 4 \\ 3 & 2 & -4 \\ -2 & 0 & 3 \end{pmatrix}, \quad C = \begin{pmatrix} 5 \\ -1 \\ -3 \end{pmatrix}.$$

$$1.15. \quad A = \begin{pmatrix} -2 & 5 & 1 \\ 3 & 4 & -5 \\ 4 & -1 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} -4 & 1 & 3 \\ -1 & 2 & -4 \\ 1 & 2 & -3 \end{pmatrix}, \quad C = \begin{pmatrix} -5 \\ 1 \\ -3 \end{pmatrix}.$$

$$1.16. \quad A = \begin{pmatrix} -2 & 4 & -2 \\ -1 & -2 & 1 \\ -2 & 3 & -1 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & -3 & 2 \\ 2 & -3 & 5 \\ 6 & 2 & 4 \end{pmatrix}, \quad C = \begin{pmatrix} -3 \\ 4 \\ -1 \end{pmatrix}.$$

$$1.17. \quad A = \begin{pmatrix} 1 & 3 & 4 \\ 5 & -1 & 3 \\ 4 & -2 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & -2 & -1 \\ -2 & 3 & 2 \\ 1 & 3 & -1 \end{pmatrix}, \quad C = \begin{pmatrix} 4 \\ -3 \\ 5 \end{pmatrix}.$$

$$1.18. \quad A = \begin{pmatrix} -2 & 1 & 6 \\ -4 & 2 & 5 \\ -1 & -2 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & -2 & 4 \\ 3 & 0 & -2 \\ 4 & -3 & 2 \end{pmatrix}, \quad C = \begin{pmatrix} -2 \\ 6 \\ 1 \end{pmatrix}.$$

$$1.19. \quad A = \begin{pmatrix} 5 & 3 & 6 \\ 3 & -1 & 3 \\ 1 & 3 & -4 \end{pmatrix}, \quad B = \begin{pmatrix} -3 & -1 & 2 \\ 2 & -3 & 4 \\ -2 & 1 & -1 \end{pmatrix}, \quad C = \begin{pmatrix} 2 \\ -3 \\ 4 \end{pmatrix}.$$

$$1.20. \quad A = \begin{pmatrix} 4 & -2 & 7 \\ 1 & 6 & -3 \\ 4 & -2 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} -1 & -6 & 3 \\ -1 & 2 & 4 \\ -3 & 2 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} 5 \\ 4 \\ -2 \end{pmatrix}.$$

$$1.21. \quad A = \begin{pmatrix} 1 & -3 & 4 \\ 3 & -2 & 5 \\ 3 & -4 & 1 \end{pmatrix}, \quad B = \begin{pmatrix} 7 & -2 & 3 \\ -1 & -6 & 3 \\ -2 & 0 & -1 \end{pmatrix}, \quad C = \begin{pmatrix} -4 \\ 5 \\ 1 \end{pmatrix}.$$

$$1.22. \quad A = \begin{pmatrix} 7 & -4 & 3 \\ 2 & -3 & -6 \\ -2 & 4 & -1 \end{pmatrix}, \quad B = \begin{pmatrix} -3 & 2 & 1 \\ -1 & 0 & 4 \\ 2 & 5 & -3 \end{pmatrix}, \quad C = \begin{pmatrix} -5 \\ -3 \\ 4 \end{pmatrix}.$$

$$1.23. \quad A = \begin{pmatrix} 2 & -1 & 3 \\ 2 & -3 & 4 \\ 3 & 2 & -1 \end{pmatrix}, \quad B = \begin{pmatrix} -4 & 5 & -6 \\ 3 & -1 & 2 \\ 6 & -5 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} -2 \\ 7 \\ 4 \end{pmatrix}.$$

$$1.24. \quad A = \begin{pmatrix} -2 & 1 & 0 \\ -3 & 2 & 1 \\ -4 & 1 & -2 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & 3 & -2 \\ 4 & -6 & -1 \\ 3 & -1 & 7 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ 5 \\ -2 \end{pmatrix}.$$

$$1.25. \quad A = \begin{pmatrix} 1 & 3 & 5 \\ -1 & -4 & 5 \\ 2 & -5 & 6 \end{pmatrix}, \quad B = \begin{pmatrix} 0 & 1 & -3 \\ 3 & 2 & 1 \\ 4 & -2 & 3 \end{pmatrix}, \quad C = \begin{pmatrix} 7 \\ -2 \\ 5 \end{pmatrix}.$$

$$1.26. \quad A = \begin{pmatrix} 2 & 5 & -3 \\ -1 & 6 & -2 \\ 3 & 0 & -2 \end{pmatrix}, \quad B = \begin{pmatrix} -1 & 3 & 5 \\ 2 & 3 & -3 \\ 2 & 1 & 4 \end{pmatrix}, \quad C = \begin{pmatrix} 2 \\ 4 \\ -3 \end{pmatrix}.$$

$$1.27. \quad A = \begin{pmatrix} 3 & -2 & 7 \\ -3 & 1 & 0 \\ -1 & -2 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 5 & 1 & -3 \\ 2 & -1 & 4 \\ 3 & 4 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} 4 \\ -3 \\ 2 \end{pmatrix}.$$

$$1.28. \quad A = \begin{pmatrix} -2 & 3 & 1 \\ 3 & 1 & -2 \\ 5 & -2 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} -6 & 4 & 5 \\ 2 & -1 & 4 \\ -1 & 1 & 3 \end{pmatrix}, \quad C = \begin{pmatrix} -6 \\ 1 \\ 3 \end{pmatrix}.$$

$$1.29. \quad A = \begin{pmatrix} 1 & -3 & 5 \\ 2 & -1 & 6 \\ -1 & 5 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 4 & -2 & 3 \\ -3 & 4 & -2 \\ 3 & 2 & -1 \end{pmatrix}, \quad C = \begin{pmatrix} -7 \\ 4 \\ -3 \end{pmatrix}.$$

$$1.30. \quad A = \begin{pmatrix} -5 & 4 & 1 \\ 3 & 1 & -6 \\ 5 & 2 & -4 \end{pmatrix}, \quad B = \begin{pmatrix} 3 & 2 & -6 \\ -1 & 2 & 4 \\ 2 & -1 & 3 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ -6 \\ 1 \end{pmatrix}.$$

Задание 2. Решить систему линейных уравнений методом Гаусса.

$$2.1. \begin{cases} x + 2y + 3z = 1 \\ 2x - 3y + 2z = 9 \\ 5x + 8y - z = 7 \end{cases}$$

$$2.3. \begin{cases} 2x + y - z = 2 \\ 3x + 2y + 2z = -2 \\ x + y - 2z = 1 \end{cases}$$

$$2.5. \begin{cases} x + 2y + 3z = 5 \\ 2x - y - z = 1 \\ x + 3y + 4z = 6 \end{cases}$$

$$2.7. \begin{cases} x + 2y - z = 2 \\ 2x - 3y + 2z = 2 \\ 3x + y + z = 8 \end{cases}$$

$$2.9. \begin{cases} x + y - z = 0 \\ 3x + 2y + z = 5 \\ 4x - y + 5z = 3 \end{cases}$$

$$2.11. \begin{cases} x - 2y + 3z = 1 \\ 2x + 3y + 2z = 9 \\ 5x - 8y - z = 7 \end{cases}$$

$$2.13. \begin{cases} 2x - y - z = 2 \\ 3x - 2y + 2z = -2 \\ x - y - 2z = 1 \end{cases}$$

$$2.15. \begin{cases} x - 2y + 3z = 5 \\ 2x + y - z = 1 \\ x - 3y + 4z = 6 \end{cases}$$

$$2.2. \begin{cases} x + y - z = -2 \\ 4x - 3y + z = 1 \\ 2x + y - z = 1 \end{cases}$$

$$2.4. \begin{cases} 5x - y - z = 0 \\ x + 2y + 3z = 14 \\ 4x + 3y + 2z = 16 \end{cases}$$

$$2.6. \begin{cases} 2x - y + 2z = -4 \\ x + y + 2z = -1 \\ 4x + y + 4z = -2 \end{cases}$$

$$2.8. \begin{cases} 2x + y + 3z = 11 \\ 3x + 2y + z = 5 \\ x + y + z = 3 \end{cases}$$

$$2.10. \begin{cases} 4x + y - 3z = 3 \\ 8x + 3y - 6z = 2 \\ x + y - z = 1 \end{cases}$$

$$2.12. \begin{cases} x + y + z = -2 \\ 4x - 3y - z = 1 \\ 2x + y + z = 1 \end{cases}$$

$$2.14. \begin{cases} x + 2y - 3z = 14 \\ 5x - y + z = 0 \\ 4x + 3y - 2z = 16 \end{cases}$$

$$2.16. \begin{cases} x + y - 2z = -1 \\ 2x - y - 2z = -4 \\ 4x + y - 4z = -2 \end{cases}$$

$$2.17. \begin{cases} x - 2y - z = 2 \\ 2x + 3y + 2z = 2 \\ 3x - y + z = 8 \end{cases}$$

$$2.19. \begin{cases} x - y - z = 0 \\ 3x - 2y + z = 5 \\ 4x + y + 5z = 3 \end{cases}$$

$$2.21. \begin{cases} x + 2y - 3z = 1 \\ 2x - 3y - 2z = 9 \\ 5x + 8y + z = 7 \end{cases}$$

$$2.23. \begin{cases} 2x + y + z = 2 \\ 3x + 2y - 2z = -2 \\ x + y + 2z = 1 \end{cases}$$

$$2.25. \begin{cases} x + 2y - 3z = 5 \\ 2x - y + z = 1 \\ x + 3y - 4z = 6 \end{cases}$$

$$2.27. \begin{cases} x + 2y + z = 2 \\ 2x - 3y - 2z = 2 \\ 3x + y - z = 8 \end{cases}$$

$$2.29. \begin{cases} x + y + z = 0 \\ 3x + 2y - z = 5 \\ 4x - y - 5z = 3 \end{cases}$$

$$2.18. \begin{cases} 2x + y - 3z = 11 \\ 3x + 2y - z = 5 \\ x + y - z = 3 \end{cases}$$

$$2.20. \begin{cases} x + y + z = 1 \\ 8x + 3y + 6z = 2 \\ 4x + y + 3z = 3 \end{cases}$$

$$2.22. \begin{cases} x + y - z = -2 \\ 4x + 3y + z = 1 \\ 2x - y - z = 1 \end{cases}$$

$$2.24. \begin{cases} x - 2y + 3z = 14 \\ 5x + y - z = 0 \\ 4x - 3y + 2z = 16 \end{cases}$$

$$2.26. \begin{cases} x - y + 2z = -1 \\ 2x + y + 2z = -4 \\ 4x - y + 4z = -2 \end{cases}$$

$$2.28. \begin{cases} 2x - y + 3z = 11 \\ 3x - 2y + z = 5 \\ x - y + z = 3 \end{cases}$$

$$2.30. \begin{cases} x - y - z = 1 \\ 8x - 3y - 6z = 2 \\ 4x - y - 3z = 3 \end{cases}$$

Задание 3. Даны координаты вершин A , B , C треугольника ABC . Найти систему неравенств, определяющую множество внутренних точек треугольника. Сделать чертёж.

$$3.1. \quad A(4, 1), \quad B(0, -2), \quad C(-5, 10).$$

$$3.2. \quad A(-7, 3), \quad B(5, -2), \quad C(8, 2).$$

- 3.3. $A(5, -1), B(1, -4), C(-4, 8).$
- 3.4. $A(-14, 6), B(-2, 1), C(1, 5).$
- 3.5. $A(6, 0), B(2, -3), C(-3, 9).$
- 3.6. $A(-9, 2), B(3, -3), C(6, 1).$
- 3.7. $A(7, -4), B(3, -7), C(-2, 5).$
- 3.8. $A(-8, 4), B(4, -1), C(7, 3).$
- 3.9. $A(3, -3), B(-1, -6), C(-6, 6).$
- 3.10. $A(-6, 5), B(6, 0), C(9, 4).$
- 3.11. $A(3, -2), B(5, 1), C(4, -8).$
- 3.12. $A(6, 1), B(-3, 7), C(8, -1).$
- 3.13. $A(-3, 21), B(6, 9), C(3, -5).$
- 3.14. $A(7, 2), B(5, 1), C(-6, -4).$
- 3.15. $A(-4, -2), B(3, 11), C(-5, 4).$
- 3.16. $A(9, -3), B(-4, 1), C(8, 3).$
- 3.17. $A(6, -1), B(5, 7), C(-2, 5).$
- 3.18. $A(-5, 1), B(7, -3), C(9, 2).$
- 3.19. $A(5, -7), B(6, 8), C(-4, 3).$
- 3.20. $A(1, -9), B(5, 3), C(-2, 4).$
- 3.21. $A(-6, -5), B(8, 4), C(3, -2).$
- 3.22. $A(-5, 1), B(9, -2), C(4, 4).$
- 3.23. $A(3, -2), B(11, 5), C(-1, 7).$
- 3.24. $A(-3, 7), B(-2, 10), C(5, -1).$
- 3.25. $A(-6, 1), B(4, 0), C(-3, -8).$
- 3.26. $A(9, -4), B(-2, 6), C(3, 1).$
- 3.27. $A(5, -2), B(0, 4), C(-5, 7).$
- 3.28. $A(-7, 6), B(3, -2), C(9, 1).$
- 3.29. $A(5, -8), B(-6, -3), C(1, 4).$
- 3.30. $A(-3, 2), B(5, -1), C(-4, -8).$