

5, 1

$$A = (a_0; a_1; a_2; a_3).$$

$$A \cdot n = (n \cdot a_0; n \cdot a_1; n \cdot a_2; n \cdot a_3)$$

$$B = (b_0; b_1; b_2; b_3).$$

$$A+B = (a_0+b_0; a_1+b_1; a_2+b_2; a_3+b_3)$$

$$C = \begin{pmatrix} c_0 \\ c_1 \\ c_2 \\ c_3 \end{pmatrix}$$

$$A \cdot B = (a_0 \cdot b_0; a_1 \cdot b_1; a_2 \cdot b_2; a_3 \cdot b_3)$$

$$A \cdot C = \begin{pmatrix} a_0 c_0; a_1 c_0; a_2 c_0; a_3 c_0 \\ a_0 c_1; a_1 c_1; a_2 c_1; a_3 c_1 \\ a_0 c_2; a_1 c_2; a_2 c_2; a_3 c_2 \\ a_0 c_3; a_1 c_3; a_2 c_3; a_3 c_3 \end{pmatrix}$$

$$A+C = \begin{pmatrix} a_0+c_0 & a_1+c_0 & a_2+c_0 & a_3+c_0 \\ a_0+c_1 & a_1+c_1 & a_2+c_1 & a_3+c_1 \\ a_0+c_2 & a_1+c_2 & a_2+c_2 & a_3+c_2 \\ a_0+c_3 & a_1+c_3 & a_2+c_3 & a_3+c_3 \end{pmatrix}$$

$$A^T = \begin{pmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \end{pmatrix}$$

$$E = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$5E - I = \begin{pmatrix} 4 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & -1 & -1 \\ -1 & -1 & 4 & -1 & -1 \\ -1 & -1 & -1 & 4 & -1 \\ -1 & -1 & -1 & -1 & 4 \end{pmatrix}$$

5.2

$$\det \begin{vmatrix} 1 & 2 & 3 \\ 4 & 0 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 1(0 \cdot 9 - 6 \cdot 8) -$$

$$= 2(4 \cdot 9 - 6 \cdot 7) + 3(4 \cdot 8 - 7 \cdot 0) =$$

$$= -48 + 12 + 96 = 60$$

5.3

$$A = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 0 & 6 \\ 7 & 8 & 9 \end{vmatrix}$$

$$A^{-1} = A^T / \det A$$

$$A^T = \begin{vmatrix} 1 & 4 & 7 \\ 2 & 0 & 8 \\ 3 & 6 & 9 \end{vmatrix}$$

$$A^{-1} = \begin{vmatrix} \frac{1}{60} & \frac{1}{15} & \frac{7}{60} \\ \frac{1}{30} & 0 & \frac{2}{15} \\ \frac{1}{20} & \frac{1}{10} & \frac{3}{20} \end{vmatrix}$$

5.3 2

$$\begin{pmatrix} 1 & 2 & -1 & 10 \\ 2 & 4 & -2 & 20 \\ 3 & 6 & -3 & 30 \\ 4 & 8 & -4 & 40 \end{pmatrix}$$

5.4

$$(1; 5) \times (2; 8) = 1 \cdot 2 + 5 \cdot 8 = 42..$$

5.5

$$\vec{a} = (1; 5; 0) ; \vec{b} = (2; 8; 7) \quad \vec{c} = (7; 1,5; 3)$$

$$\vec{a} \cdot \vec{b} \cdot \vec{c} = \begin{vmatrix} 1 & 5 & 0 \\ 2 & 8 & 7 \\ 7 & 1,5 & 3 \end{vmatrix} =$$

$$= 1 \cdot (8 \cdot 3 - 7 \cdot 1,5) - 5(2 \cdot 3 - 7 \cdot 7) +$$

$$+ 0 = 24 - 10,5 + 215 = 228,5$$