1.

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

2. $L = \begin{bmatrix} 1 & 0 & 0 & 0 \\ \frac{1}{8} & 1 & 0 & 0 \\ \frac{1}{2} & \frac{2}{3} & 1 & 0 \\ \frac{5}{8} & -\frac{3}{7} & \frac{13}{203} & 1 \end{bmatrix}, U = \begin{bmatrix} -8 & 4 & -5 & -2 \\ 0 & -\frac{21}{2} & \frac{45}{8} & -\frac{27}{4} \\ 0 & 0 & -\frac{29}{4} & \frac{19}{2} \\ 0 & 0 & 0 & -\frac{863}{203} \end{bmatrix}$

3.

$$\begin{pmatrix} 12 & 4 & 15 \\ -9 & -16 & 18 \\ -19 & -19 & -6 \end{pmatrix}$$

4.

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 2 & 5 & 1 & 3 & 4 \end{pmatrix} ; \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 4 & 2 & 3 & 6 & 5 \end{pmatrix}$$

5.

$$\sigma = (1,8,6,2,7)(3,9,4,5), ord = 20, \sigma^{-727} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 2 & 8 & 9 & 5 & 3 & 1 & 6 & 7 & 4 \end{pmatrix} = (1,2,8,7,6)(3,9,4,5)$$

6. Id;(2, 3, 7, 5, 6);(2, 5, 3, 6, 7);(2, 6, 5, 7, 3);
   (2, 7, 6, 3, 5);(1, 4);(1, 4) (2, 3, 7, 5, 6);(1, 4) (2, 5, 3, 6, 7);(1, 4) (2, 6, 5, 7, 3);
   (1, 4) (2, 7, 6, 3, 5);

7. брак

8. $4 + 2 * x + 2 * x^2 + -2 * x^3 + -3 * x^4$

9. При $\lambda = 7$

10. Определитель: $-138\lambda - 290$, при $\lambda = [-145/69]$ ранг равен 3, иначе 4