**P,**

$$\det(A) = \begin{vmatrix} 2 & -1 & 1 & & & \\ -1 & 2 & -1 & & & \\ 1 & & \ddots & & & \\ & & & \ddots & & \\ & & & & & 2 \end{vmatrix} = \begin{vmatrix} 1 & 1 & 1 & & & \\ & 1 & 1 & & & \\ & & 1 & & & \\ & & & \ddots & & \\ \pm 1 & \mp 1 & & & -1 & 2 \end{vmatrix}$$

$$= \begin{vmatrix} 1 & & & & & \\ & 1 & & & & \\ & & 1 & & & \\ & & & \ddots & & \\ \pm 1 & & & & n-1 & n & n+1 \end{vmatrix}$$

$$= n+1$$

**2.**

$$A = \begin{matrix} & s_1 \quad ----\sim \quad s_{120} \\ P_1 \\ P_2 \\ P_3 \\ P_4 \\ P_5 \\ P_6 \end{matrix} \left( \quad\quad a_{ij} \quad\quad\quad\quad \right)$$

$$a_{ij} = \begin{cases} & \text{if } P_i \text{ is solved by } s_j \\ & \text{others} \end{cases}$$

$$\frac{1}{n!} x^n$$

$$A \cdot A^T =$$