

# Quiz II

성명(학번) 한영 (2020032706)

1. Cramer의 공식을 이용하여 다음 연립방정식을 풀어라. (5점)

$$\begin{cases} 5x_1 + 3x_2 + 3x_3 = 4 \\ 2x_1 + 6x_2 - 3x_3 = -2 \\ 8x_1 - 3x_2 + 2x_3 = -7 \end{cases}$$

$$D = \begin{vmatrix} 5 & 3 & 3 \\ 2 & 6 & -3 \\ 8 & -3 & 2 \end{vmatrix} = 60 - 12 - 18 - 144 - 45 - 12 = -221$$

$$D_{x_1} = \begin{vmatrix} 4 & 3 & 3 \\ -2 & 6 & -3 \\ -7 & -3 & 2 \end{vmatrix} = 48 + 63 + 18 + 126 + 12 - 36 = 271$$

$$D_{x_2} = \begin{vmatrix} 5 & 4 & 3 \\ 2 & -2 & -3 \\ 8 & -7 & 2 \end{vmatrix} = -20 - 96 - 42 + 48 - 105 - 16 = -221$$

$$D_{x_3} = \begin{vmatrix} 5 & 3 & 4 \\ 2 & 6 & -2 \\ 8 & -7 & -7 \end{vmatrix} = -210 - 48 - 24 - 192 - 30 + 42 = -462$$

$$\therefore x_1 = \frac{D_{x_1}}{D} = -1, x_2 = \frac{D_{x_2}}{D} = 1, x_3 = \frac{D_{x_3}}{D} = 2$$

2. 다음 행렬의 수반행렬을 구하시오. (5점)

$$\begin{pmatrix} 24 & 3 \\ 01 & -1 \\ 35 & 7 \end{pmatrix}$$

$$A_{11} = \begin{vmatrix} 1 & -1 \\ 5 & 7 \end{vmatrix} = 12 \quad A_{12} = \begin{vmatrix} 0 & -1 \\ 3 & 7 \end{vmatrix} = -3 \quad A_{13} = \begin{vmatrix} 0 & 1 \\ 3 & 5 \end{vmatrix} = -3$$

$$A_{21} = -\begin{vmatrix} 4 & 3 \\ 5 & 7 \end{vmatrix} = -13 \quad A_{22} = \begin{vmatrix} 2 & 3 \\ 3 & 7 \end{vmatrix} = 5 \quad A_{23} = -\begin{vmatrix} 2 & 4 \\ 3 & 5 \end{vmatrix} = 2$$

$$A_{31} = \begin{vmatrix} 4 & 3 \\ 1 & -1 \end{vmatrix} = -7 \quad A_{32} = -\begin{vmatrix} 2 & 3 \\ 0 & -1 \end{vmatrix} = 2 \quad A_{33} = \begin{vmatrix} 2 & 4 \\ 0 & 1 \end{vmatrix} = 2$$

$$\therefore \bar{A} = \begin{bmatrix} 12 & -13 & -7 \\ -3 & 5 & 2 \\ -3 & 2 & 2 \end{bmatrix}$$

3. 반드시 행렬식을 이용하여 두 방정식  $x^3+ax+2=0$ 과  $x^2+2x+a=0$ 이 공통근을 갖도록  $a$ 의 값을 구하여라. (5점)

$$\begin{vmatrix} 1 & 0 & a & 2 & 0 \\ 0 & 1 & 0 & a & 2 \\ 1 & 2 & a & 0 & 0 \\ 0 & 1 & 2 & a & 0 \\ 0 & 0 & 1 & 2 & a \end{vmatrix}$$

$$= \begin{vmatrix} 1 & 0 & a & 2 \\ 2 & a & 0 & 0 \\ 1 & 2 & a & 0 \\ 0 & 1 & 2 & a \end{vmatrix} + \begin{vmatrix} 0 & a & 2 & 0 \\ 1 & 0 & a & 2 \\ 1 & 2 & a & 0 \\ 0 & 1 & 2 & a \end{vmatrix}$$

$$= -2 \begin{vmatrix} 0 & a & 2 \\ 2 & a & 0 \\ 1 & 2 & a \end{vmatrix} + a \begin{vmatrix} 1 & a & 2 \\ 1 & a & 0 \\ 0 & 2 & a \end{vmatrix} - \begin{vmatrix} a & 2 & 0 \\ 2 & a & 0 \\ 1 & 2 & a \end{vmatrix} + \begin{vmatrix} a & 2 & 0 \\ 0 & a & 2 \\ 1 & 2 & a \end{vmatrix}$$

$$= -2(8-2a-2a^2) + a(a^2+4-a^2) - (a^3-4a) + (a^3+4-4a)$$

$$= -16+4a+4a^2+a^3+4a-a^3-a^3+4a+a^3+4-4a$$

$$= 4a^2+8a-12 = 4(a^2+2a-3) = 4(a-1)(a+3) = 0$$

$$\therefore a=1, a=-3$$