

Engineering Mathematics I---Quiz-9s

$$1) A = \begin{bmatrix} 0 & 2 & 4 & 0 \\ 1 & 2 & -2 & 3 \\ 5 & 1 & 0 & -1 \\ 1 & 1 & 1 & 2 \end{bmatrix} \quad \text{a) } M_{33} \quad \text{b) } C_{34}$$

$$\boxed{\text{ANS}} \quad \text{a) } M_{33} = \begin{vmatrix} 0 & 2 & 0 \\ 1 & 2 & 3 \\ 1 & 1 & 2 \end{vmatrix} = 2 \quad \text{b) } C_{34} = (-1)^{3+4} \begin{vmatrix} 0 & 2 & 4 \\ 1 & 2 & -2 \\ 1 & 1 & 1 \end{vmatrix} = 10$$

$$2) A = \begin{bmatrix} 1 & 1 & -3 & 0 \\ 1 & 5 & 3 & 2 \\ 1 & -2 & 1 & 0 \\ 4 & 8 & 0 & 0 \end{bmatrix} \quad \det(A) = ?$$

$$\boxed{\text{ANS}} \quad \det(A) = 2 \begin{vmatrix} 1 & 1 & -3 \\ 1 & -2 & 1 \\ 4 & 8 & 0 \end{vmatrix} = -104$$

3) Use either Gaussian elimination or Gauss-Jordan elimination to solve the given

$$\text{system. a) } \begin{cases} x_1 - x_2 = 11 \\ 4x_1 + 3x_2 = -5 \end{cases} \quad \text{b) } \begin{cases} x_1 + 2x_2 + 2x_3 = 2 \\ x_1 + x_2 + x_3 = 0 \\ x_1 - 3x_2 - x_3 = 0 \end{cases}$$

$$\boxed{\text{ANS}} \quad \text{a) } \left[\begin{array}{cc|c} 1 & -1 & 11 \\ 4 & 3 & -5 \end{array} \right] = \left[\begin{array}{cc|c} 1 & -1 & 11 \\ 0 & 7 & -49 \end{array} \right] = \left[\begin{array}{cc|c} 1 & 0 & 4 \\ 0 & 1 & -7 \end{array} \right], \quad \begin{cases} x_1 = 4 \\ x_2 = -7 \end{cases}$$

$$\text{b) } \left[\begin{array}{ccc|c} 1 & 2 & 2 & 2 \\ 1 & 1 & 1 & 0 \\ 1 & -3 & -1 & 0 \end{array} \right] = \left[\begin{array}{ccc|c} 1 & 2 & 2 & 2 \\ 0 & -1 & -1 & -2 \\ 0 & -5 & -3 & -2 \end{array} \right] = \left[\begin{array}{ccc|c} 1 & 2 & 2 & 2 \\ 0 & -1 & -1 & -2 \\ 0 & 0 & 2 & 8 \end{array} \right] = \left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 2 & 8 \end{array} \right]$$

$$= \left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 4 \end{array} \right], \quad \begin{cases} x_1 = -2 \\ x_2 = -2 \\ x_3 = 4 \end{cases}$$