

Question #6:

$$\begin{aligned}
 \det A &= \begin{vmatrix} 2 & 0 & -2 & 1 \\ 0 & 3 & 3 & 1 \\ -1 & 4 & 0 & 2 \\ 3 & -2 & 4 & 2 \end{vmatrix} = \begin{vmatrix} 2 & 0 & -2 & 1 \\ 0 & 3 & 3 & 1 \\ 0 & 4 & -1 & 5/2 \\ 0 & -2 & 7 & 1/2 \end{vmatrix} \\
 &= \begin{vmatrix} 2 & 0 & -2 & 1 \\ 0 & 3 & 3 & 1 \\ 0 & 0 & -5 & 7/6 \\ 0 & 0 & 9 & 7/6 \end{vmatrix} \\
 &= \begin{vmatrix} 2 & 0 & -2 & 1 \\ 0 & 3 & 3 & 1 \\ 0 & 0 & -5 & 7/6 \\ 0 & 0 & 0 & 49/15 \end{vmatrix} \\
 &= \begin{vmatrix} 2 & 0 & -2 & 1 \\ 0 & 3 & 3 & 1 \\ 0 & 0 & -5 & 7/6 \\ 0 & 0 & 0 & 49/15 \end{vmatrix}
 \end{aligned}$$

$$\Delta = 2 \times 3 \times -5 \times 49/15$$

$$= \underline{\underline{-98}}$$

$$\det B = \begin{vmatrix} 1 & 1/2 & 1/3 \\ 1/2 & 1/3 & 1/4 \\ 1/3 & 1/4 & 1/5 \end{vmatrix} = \begin{vmatrix} 1/2 & 1/4 & 1/6 \\ 1/2 & 1/3 & 1/4 \\ 1/3 & 1/4 & 1/5 \end{vmatrix}$$

$$= \begin{bmatrix} 1/3 & 1/6 & 1/9 \\ 0 & 1/12 & 1/12 \\ 1/3 & 1/4 & 1/5 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1/2 & 1/3 \\ 0 & 1/12 & 1/12 \\ 0 & 1/12 & 4/45 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1/2 & 1/3 \\ 0 & 1/12 & 1/12 \\ 0 & 0 & 1/180 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1/2 & 1/3 \\ 0 & 1/12 & 1/12 \\ 0 & 0 & 1/180 \end{bmatrix}$$

$$\Delta = 1 \times 1/12 \times 1/180 = \frac{1}{2160}$$