

Quiz 6

Question 1. (7 marks) Given:

$$A = \begin{bmatrix} 2 & -3 & 5 \\ 0 & 1 & -3 \\ 0 & 0 & 2 \end{bmatrix}$$

(a) Find $\text{Adj}(A)$.

$$C_{11} = 2$$

$$C_{32} = 6$$

$$C_{12} = 0$$

$$C_{33} = 2$$

$$C_{13} = 0$$

$$C_{21} = -6$$

$$C_{22} = 4$$

$$C_{23} = 0$$

$$C_{31} = 4$$

$$\begin{array}{l} \text{MATRIX OF} \\ \text{COFACTORS} \end{array} = \begin{bmatrix} 2 & 0 & 0 \\ 6 & 4 & 0 \\ 4 & -6 & 2 \end{bmatrix}$$

$$\text{Adj } A = \begin{bmatrix} 2 & 6 & 4 \\ 0 & 4 & 6 \\ 0 & 0 & 2 \end{bmatrix}$$

(b) Use part (a) to find A^{-1} .

$$A^{-1} = \frac{1}{\det A} \text{Adj } A = \frac{1}{4} \begin{bmatrix} 2 & 6 & 4 \\ 0 & 4 & 6 \\ 0 & 0 & 2 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & \frac{3}{2} & 1 \\ 0 & 1 & \frac{3}{2} \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$$

Question 2. (3 marks) A and B are 3×3 invertible matrices such that $\det A = -5$ and $\det B = 2$. Find:

$$\begin{aligned} \det((2A)^T B^{-1}) &= \det(2A)^T \det(B^{-1}) \\ &= \det(2A) \frac{1}{\det B} \\ &= 2^3 \det A \frac{1}{2} \\ &= 2^2 (-5) \frac{1}{2} = -20 \end{aligned}$$