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Linear Algebra

a) A : 2 x 3
B : 4 x 3
C : 1 x 5
D : 2 x 2
E = 1 x 1
F : 5 x 1
G : 3 x 3

b) Square Matrices : D, E, G

c) Symmetric : E, G

d) B,

e) A, B

f) E, F

g) C, E

h) $A_T = \begin{bmatrix} -1 & 0 \\ 2 & -2 \\ 10 & -11 \end{bmatrix}$, $C_T = \begin{bmatrix} -3 \\ 2 \\ 9 \\ -5 \\ 7 \end{bmatrix}$

$E_T = [8]$ $G_T = \begin{bmatrix} -5 & -4 & 23 \\ -4 & -3 & 4 \\ 23 & 4 & 1 \end{bmatrix} = G$

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2)

$$AB = \begin{bmatrix} 3 & -1 & -2 \\ -1 & 4 & -5 \end{bmatrix}$$

$$F = E = \begin{bmatrix} -25 \\ -55 \\ 55 \end{bmatrix}$$

3) Determ.

$$|M| = 15X2 - 30 = -15$$

$$|M_{21}| = 2(-2-5) - 3(1-9) + 1(-2-5)$$
$$= -24 + 24 - 8 = \boxed{-8}$$

4) Inverse

$$\text{inverse}(A) = \frac{1}{-3+5} \begin{bmatrix} 4 & 3 & 2 \\ -3 & -3 & \end{bmatrix}$$

$$= \begin{bmatrix} -1 & \frac{-2}{3} \\ 1 & 1 \end{bmatrix}$$

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$\det(A_2) = -1$

cofactor : $\begin{bmatrix} 0 & 1 & -1 \\ 1 & 0 & -1 \\ -1 & -1 & 1 \end{bmatrix}$

$adj(A) = \begin{bmatrix} 0 & 1 & -1 \\ 1 & 0 & -1 \\ -1 & -1 & 1 \end{bmatrix}$

$inverse(A_2) = \begin{bmatrix} 0 & -1 & 1 \\ -1 & 0 & 1 \\ 1 & 1 & -1 \end{bmatrix}$

(5) [6]