1. Solve the following matrix equation for a, b, c and d.

$$\begin{bmatrix} a-b & b+c \\ 3d+c & 2a-4d \end{bmatrix} = \begin{bmatrix} 8 & 1 \\ 7 & 6 \end{bmatrix}.$$

2. Consider the matrices :

$$A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix} , B = \begin{bmatrix} 4 & -1 \\ 0 & 2 \end{bmatrix} , C = \begin{bmatrix} 1 & 4 & 2 \\ 3 & 1 & 5 \end{bmatrix},$$

$$\mathbf{D} = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix} , \qquad \mathbf{E} = \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix} ,$$

Compute the following (where possible)

(a)
$$D + E$$
 (b) $-7C$, (c) $2B - C$, (d) $-3(D + 2E)$, (e) $A - A$, (f) $tr(D - 3E)$.

3. Using the matrices in exercise (2), compute the following (where possible):

(a)
$$2A^{T} + C$$
, (b) $(2E^{T} - 3D^{T})^{T}$, (c) $(D - E)^{T}$, (d) $B^{T} + 5C^{T}$, (e) $\frac{1}{2}C^{T} - \frac{1}{4}A$.

4. Using the matrices in exercise (2), compute the following (where possible).

(g)
$$(C^T B) A^T$$
, (h) tr (DD^T) , (i) tr $(4E^T - D)$.

5. Using the matrices in exercise (2), compute the following (where possible):

(a)
$$(2D^T - E) A$$
, (b) $(BA^T - 2C)^T$.

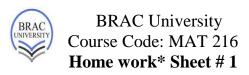
1. Let
$$A = \begin{bmatrix} 1 & -2 & 3 \\ 6 & 7 & -1 \\ -3 & 1 & 4 \end{bmatrix}$$
,

(a). Find all the minors of A

(b) Find all the cofactors, (c) Find adj (A),

(d) Find
$$A^{-1}$$
, Using $A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A)$.

^{*}These problems are for the students only as home work. Search the reference books for more examples.



11. Let
$$A\begin{bmatrix} 2 & 5 & 5 \\ -1 & -1 & 0 \\ 2 & 4 & 3 \end{bmatrix}$$
, find A^{-1} .

13. Let
$$A = \begin{bmatrix} 2 & -3 & 5 \\ 0 & 1 & -3 \\ 0 & 0 & 2 \end{bmatrix}$$
, find A^{-1} .

(*) Find the inverse of the matrix

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

(**) Let
$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{bmatrix}$$
 and $B = \begin{bmatrix} 2 & 5 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$, then prove that $(AB)^{-1} = B^{-1} \cdot A^{-1}$

(***) Find the inverse of
$$A = \begin{bmatrix} 1 & -1 & 2 & 1 \\ 3 & 0 & 2 & 2 \\ 2 & 1 & -1 & 1 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$
.

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