

## Assignment 7

(5 questions

x 2 = 10 marks)

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

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

2. Consider the matrices:

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

$$D = \begin{pmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{pmatrix} \quad E = \begin{pmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{pmatrix}$$

Compute the following where possible.

a)  $2B - C$

b)  $4E - D$

c)  $4\text{tr}(7B)$

d)  $\text{tr} A$

3. Using the matrices in question 2, compute the following where possible.

a)  $2A^+ + C$

b)  $(D - E)^+$

c)  $B - B^+$

d)  $(2E^+ - 3D^+)^+$

4. Using the matrices in question 2, compute the following where possible.

a)  $AB$

b)  $(DA)^{\dagger}$

c)  $\text{tr}(4E^{\dagger} - D)$

d)  $(AB)C$

5. Using the matrices in question 2, compute the following where possible.

a)  $(2D^{\dagger} - E)A$

b)  $(BA^{\dagger} - 2C)^{\dagger}$

c)  $(-AC)^{\dagger} + 5D^{\dagger}$

d)  $D^{\dagger}E^{\dagger} - (ED)^{\dagger}$