Let $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$

$B = \begin{pmatrix} -1 & 2 \end{pmatrix}$

$C = \begin{pmatrix} 3 & 1 & 2 \\ 1 & 6 & 4 \end{pmatrix}$

$D = \begin{pmatrix} 0 & 1 \\ 1 & -1 \end{pmatrix}$

$E = \begin{pmatrix} 5 & 2 \\ -3 & 0 \end{pmatrix}$

$F = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$

$G = \begin{pmatrix} 4 & -1 & 2 \\ 0 & 1 & 3 \end{pmatrix}$

Q1. Write down the size of each matrix. Which pairs are compatible for addition? Subtraction?

Q2. Calculate each of the following where possible.

(a) $A+B$
(b) $A+2B$
(c) $A+E$
(d) $A-3E$
(e) $A-E$
(f) $6+2C$
(g) $E-A$
(h) $C-2B$
(i) $B+F$
(j) $A/2-B$
(k) $2(B+C)-(D+E)$
(l) $A+0+D-E$

Q3. Solve for X

(a) $X = 2E-A$
(b) $2X = 5E+2A$
(c) $3C + X = -6$
(d) $A/3 + X = E$
(e) $3(A+2D) - X = 4E$

Q4. (Challenge) Solve simultaneously for X and Y. Hint: start by solving for

X or Y as you would with an ordinary pair of simultaneous equations.

$$3X + 2Y = 5A$$
$$X - Y = 2D - A$$

Answers:

Q1. A is 2X2, B is 1x2, C is 2x3, D is 2x2, E is 2x2, F is 2x1, G is 2x3

The only pairs compatible for addition or subtraction are A & D, A & E, D & E and C & G.

Q2(a) Not possible since A is 2x2 and B is 1x2.

(b) Not possible since A is 2x2 and 2B is 1x2.

(c) $\begin{pmatrix} 6 & 4 \\ 0 & 4 \end{pmatrix}$

(d) $\begin{pmatrix} -14 & -4 \\ 12 & 4 \end{pmatrix}$

(e) $\begin{pmatrix} -4 & 0 \\ 6 & 4 \end{pmatrix}$

(f) $\begin{pmatrix} 10 & 1 & 6 \\ 2 & 13 & 11 \end{pmatrix}$

(g) $\begin{pmatrix} 4 & 0 \\ -6 & -4 \end{pmatrix}$

(h) $\begin{pmatrix} -5 & 3 & -2 \\ 1 & 4 & -2 \end{pmatrix}$

(i) Not possible since B is 1x2 and F is 2x1.

(j) Not possible since $A/2$ is 2×2 and B is 1×2

(k) Not possible since B is 1×2 and C is 2×3.

(l) $\begin{pmatrix} -4 & 1 \\ 7 & 3 \end{pmatrix}$

Q3.(a) $X = \begin{pmatrix} 9 & 2 \\ -9 & -4 \end{pmatrix}$ (b) $X = \begin{pmatrix} 27/2 & 7 \\ -9/2 & 4 \end{pmatrix}$

(c) $X = \begin{pmatrix} -13 & -2 & -8 \\ -3 & -19 & -15 \end{pmatrix}$ (d) $X = \begin{pmatrix} 14/3 & 4/3 \\ -4 & -4/3 \end{pmatrix}$

(e) $X = \begin{pmatrix} -17 & 4 \\ 27 & 6 \end{pmatrix}$

Q4. $X = \begin{pmatrix} 3/5 & 2 \\ 13/5 & 8/5 \end{pmatrix}$ $Y = \begin{pmatrix} 8/5 & 2 \\ 18/5 & 38/5 \end{pmatrix}$