Exercise 14.3

1 The matrice A and B are given by $A = \begin{pmatrix} 1 & -2 \\ 3 & 2 \end{pmatrix}$, and $B = \begin{pmatrix} 2 & -2 \\ 1 & 4 \end{pmatrix}$.

Find matrices P and Q such that

  a $P = A^2 - 2B$

  b $Q = A(B^{-1})$

2 The matrices A and B are given by $A = \begin{pmatrix} 2 & 1 \\ -1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 2 \\ 6 & 5 \end{pmatrix}$.

Find the values of p and q such that

  a $A^2 + 7I = pA$

  b $B^2 + 8I = qB$

3 The matrices A and B are given by $A = \begin{pmatrix} 3 & -1 \\ -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 1 \\ 6 & 4 \end{pmatrix}$.

Show that

  a $5A^{-1} = 5I - A$

  b $2B^{-1} = 6I - B$