Matrices

(a)

$\mathbf{A} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Given that

$m\mathbf{A} = \begin{pmatrix} 7m + 8 \\ 12 + m \end{pmatrix}$

find the value of m

(b)

$\begin{pmatrix} 3 & -1 \\ a & 2 \end{pmatrix} \begin{pmatrix} b \\ 4 \end{pmatrix} = \begin{pmatrix} 11 \\ -2 \end{pmatrix}$

Find the values of a and b

(c)

Work out

$\begin{pmatrix} 3 & 1 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 5 & -4 \end{pmatrix}$

(d)

Work out

$2 \begin{pmatrix} 1 & -2 \\ 4 & 0 \end{pmatrix} \begin{pmatrix} 0 & -3 \\ 2 & 6 \end{pmatrix}$

(e)

Given that

$\begin{pmatrix} 4 & -1 \\ 2 & 3 \end{pmatrix} \mathbf{M} = \begin{pmatrix} 4 & -1 \\ 2 & 3 \end{pmatrix}$

write down matrix $\mathbf{M}$

(f)

Show that

$\begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} 6 & 3 \\ 0 & 3 \end{pmatrix} = k\mathbf{I}$

where k is an integer to be found

(g)

Given that

$\begin{pmatrix} 2 & s \\ -5 & 4 \end{pmatrix} \begin{pmatrix} 12 & 3 \\ t & 6 \end{pmatrix} = 9\mathbf{I}$

find the values of s and t

(h)

$\begin{pmatrix} 4 & x \\ 0 & y \end{pmatrix} \begin{pmatrix} -1 & 1 \\ 3 & x \end{pmatrix} = \begin{pmatrix} 2 & 8 \\ 3y & 10 \end{pmatrix}$

Work out the values of x and y

(i)

$\mathbf{A} = \begin{pmatrix} -2 & 3 \\ p & q \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$

Given that $\mathbf{AB} = \mathbf{BA}$,

find the values of p and q

(j)

$\begin{pmatrix} 4 & a \\ b & 2 \end{pmatrix} \begin{pmatrix} -5 \\ a \end{pmatrix} = \begin{pmatrix} a \\ 15 \end{pmatrix}$

Work out the possible pairs of values of a and b

Matrices

(a)

$\mathbf{A} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Given that

$m\mathbf{A} = \begin{pmatrix} 7m + 8 \\ 12 + m \end{pmatrix}$

find the value of m

$m = -4$

(b)

$\begin{pmatrix} 3 & -1 \\ a & 2 \end{pmatrix}\begin{pmatrix} b \\ 4 \end{pmatrix} = \begin{pmatrix} 11 \\ -2 \end{pmatrix}$

Find the values of a and b

$a = -2, b = 5$

(c)

Work out

$\begin{pmatrix} 3 & 1 \\ 0 & -1 \end{pmatrix}\begin{pmatrix} 2 & 0 \\ 5 & -4 \end{pmatrix}$

$\begin{pmatrix} 11 & -4 \\ -5 & 4 \end{pmatrix}$

(d)

Work out

$2\begin{pmatrix} 1 & -2 \\ 4 & 0 \end{pmatrix}\begin{pmatrix} 0 & -3 \\ 2 & 6 \end{pmatrix}$

$\begin{pmatrix} -8 & -30 \\ 0 & -24 \end{pmatrix}$

(e)

Given that

$\begin{pmatrix} 4 & -1 \\ 2 & 3 \end{pmatrix}\mathbf{M} = \begin{pmatrix} 4 & -1 \\ 2 & 3 \end{pmatrix}$

write down matrix $\mathbf{M}$

$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(f)

Show that

$\begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix}\begin{pmatrix} 6 & 3 \\ 0 & 3 \end{pmatrix} = k\mathbf{I}$

where k is an integer to be found

$k = 6$

(g)

Given that

$\begin{pmatrix} 2 & s \\ -5 & 4 \end{pmatrix}\begin{pmatrix} 12 & 3 \\ t & 6 \end{pmatrix} = 9\mathbf{I}$

find the values of s and t

$s = -1, t = 15$

(h)

$\begin{pmatrix} 4 & x \\ 0 & y \end{pmatrix}\begin{pmatrix} -1 & 1 \\ 3 & x \end{pmatrix} = \begin{pmatrix} 2 & 8 \\ 3y & 10 \end{pmatrix}$

Work out the values of x and y

$x = 2, y = 5$

(i)

$\mathbf{A} = \begin{pmatrix} -2 & 3 \\ p & q \end{pmatrix}\ \mathbf{B} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$

Given that $\mathbf{AB} = \mathbf{BA}$,

find the values of p and q

$p = 0, q = -2$

(j)

$\begin{pmatrix} 4 & a \\ b & 2 \end{pmatrix}\begin{pmatrix} -5 \\ a \end{pmatrix} = \begin{pmatrix} a \\ 15 \end{pmatrix}$

Work out the possible pairs of values of a and b

$a = 5, b = -1$

$a = -4, b = -\frac{23}{5}$