



AQA Qualifications

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# AQA Level 2 Certificate

## FURTHER MATHEMATICS

Level 2 (8360)

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Worksheet 5  
Matrices 1

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# 5 Matrices 1

## Question 1

Work out

(a)  $\begin{pmatrix} 4 & 2 \\ -3 & 5 \end{pmatrix} \begin{pmatrix} 7 \\ 1 \end{pmatrix}$

(b)  $\begin{pmatrix} 5 & 0 \\ 0 & 5 \end{pmatrix} \begin{pmatrix} -3 \\ -4 \end{pmatrix}$

(c)  $2 \begin{pmatrix} 5 & -2 \\ 6 & -3 \end{pmatrix}$

(d)  $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

(e)  $6 \begin{pmatrix} -4 & 7 \\ -1 & -3 \end{pmatrix}$

(f)  $\begin{pmatrix} 8 & 4 \\ 4 & 2 \end{pmatrix} \begin{pmatrix} -3 \\ 6 \end{pmatrix}$

(12 marks)

## Question 2

Work out

(a)  $\begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 0 & 3 \\ 1 & -4 \end{pmatrix}$

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

(c)  $\begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix} \begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix}$

(d)  $\begin{pmatrix} 10 & -7 \\ 9 & 8 \end{pmatrix} \begin{pmatrix} 2 & 4 \\ -2 & 3 \end{pmatrix}$

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

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

(12 marks)

## Question 3 (non-calculator)

Work out, giving your answers as simply as possible.

(a)  $\begin{pmatrix} \sqrt{2} & 1 \\ -1 & 3\sqrt{2} \end{pmatrix} \begin{pmatrix} \sqrt{2} & 0 \\ -3 & -2\sqrt{2} \end{pmatrix}$

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

(c)  $\begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix}^2$

(d)  $\begin{pmatrix} 3\sqrt{3} & -4 \\ 2 & 3\sqrt{3} \end{pmatrix} \begin{pmatrix} \sqrt{3} & 1 \\ -4 & 0 \end{pmatrix}$

(e)  $\begin{pmatrix} 1 & 1 \\ 3 & 2 \\ \frac{2}{3} & \frac{1}{4} \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$

(f)  $\begin{pmatrix} \sqrt{2} & 2 \\ 7 & \sqrt{3} \end{pmatrix}^2$

(17 marks)

**Question 4**

Work out, giving your answers as simply as possible.

(a) 
$$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} p \\ p+1 \end{pmatrix}$$

(b) 
$$\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

(c) 
$$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} m \\ 2m \end{pmatrix}$$

(d) 
$$\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} -a & 0 \\ 0 & a \end{pmatrix}$$

(e) 
$$\begin{pmatrix} 4t & 0 \\ 0 & 4t \end{pmatrix} \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$$

(f) 
$$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

(13 marks)

**Question 5**

Work out, giving your answers as simply as possible.

(a) 
$$\begin{pmatrix} 2x & -3 \\ -5 & 4x \end{pmatrix} \begin{pmatrix} x & 3x \\ -3 & 0 \end{pmatrix}$$

(b) 
$$\begin{pmatrix} a & 3a \\ -2 & 1 \end{pmatrix} \begin{pmatrix} 7 & 8 \\ -10 & 11 \end{pmatrix}$$

(c) 
$$\begin{pmatrix} x & 0 \\ 1 & x \end{pmatrix}^2$$

(d) 
$$\begin{pmatrix} y & y \\ -3 & x \end{pmatrix} \begin{pmatrix} 2 & 3y \\ 0 & 1 \end{pmatrix}$$

(e) 
$$\begin{pmatrix} a+1 & a \\ a+2 & a+1 \end{pmatrix} \begin{pmatrix} a+1 & -a \\ -a-2 & a+1 \end{pmatrix}$$

(f) 
$$\begin{pmatrix} 3x & -3 \\ -9 & x+1 \end{pmatrix}^2$$

(14 marks)