Guidance

1. Read each question carefully.
2. Don’t spend too long on each question.
3. Attempt every question.
4. Always show your workings.

Revise GCSE Maths:
www.MathsMadeEasy.co.uk/gcse-maths-revision/
1. Translate the shape A by the vector \((-10, -2)\). Label the new shape B.

Translate the shape B by the vector \((6, -3)\). Label the new shape C.

Describe fully the single transformation from A to C.

Translation by the vector \((-\frac{14}{5}, -\frac{4}{5})\)

(2 marks, 2 marks, 2 marks)
2. Rotate the shape D by 180° clockwise about (0,0). Label the new shape E.

Rotate the shape D by 180° anticlockwise about (3,1). Label the new shape F.

Describe fully the single transformation from E to F.

Translation by the vector \((\frac{5}{3})\)

(2 marks, 2 marks, 2 marks)
3. Reflect the four shapes below in the line of reflection.

4. Reflect the shape G separately in the following three lines. Label the new shape in each case.

- $H \ y = 3$
- $J \ x = -1$
- $K \ y = 5 - x$
5. Enlarge the shape below by a scale factor of 0.5 and 2, with a centre of enlargement at (0,5)

(4 marks)
6. Enlarge the shape X by a scale factor of -2 with centre of enlargement (0,0). Label the new shape Y.
7. Each shape below has undergone a single transformation, starting from shape L. Describe fully each transformation.

**M:** Reflection in the line $x = 0$

**N:** Reflection in the line $y = x$ or Translation $(-6, -6)$

**P:** Rotation of $180^\circ$ about $(1, -1)$ or Enlargement of -1 at $(1, -1)$

**Q:** Rotation of $180^\circ$ about $(3,0)$ or Enlargement of -1 at $(3,0)$

**R:** Reflection in the line $y = x - 2$ or Rotation of $180^\circ$ at $(3.5,1.5)$

(5 marks)
8. For the following transformations, write down which points are invariant.

Reflect the shape S in the line $y = 7 - x$. Label the new shape T.

$\begin{pmatrix} 4,3 \end{pmatrix}$ and $\begin{pmatrix} 5,2 \end{pmatrix}$

Translate the shape S by the vector $\begin{pmatrix} -3 \\ 0 \end{pmatrix}$. Label the new shape U.

Rotate the shape S by 180° about (5,5). Label the new shape W.
9. Enlarge the shape below as follows:

Centre of enlargement (-7,12) scale factor 3

Then enlarge the new shape by:
Centre of enlargement (-7,3) scale factor \( \frac{2}{3} \)

What is the centre of enlargement and scale factor that combines these two transformations? Mark the centre of enlargement as X on your diagram.

What do you observe about this transformation?

*The transformation has a scale factor of two from the original shape.*

(7 marks)
10. Reflect the shape X in the line with gradient 1 such that the point \((-3,2)\) is invariant. Label the new shape Y.

Rotate the shape Y by 270° clockwise such that the point \((-1,0)\) is invariant. Label the new shape Z.

Can Z be translated such that there are invariant points on Z? Give your reasoning.

\textit{No, because translating a shape moves all of the points.}

(2 marks, 2 marks, 1 mark)