

Name: _____ Maths Group: _____ Tutor Set: _____

Homework Booklet

KS3 Levels 3-8

Unit 15 – Transformations

Remember to use the back of a page if you need more working out space.

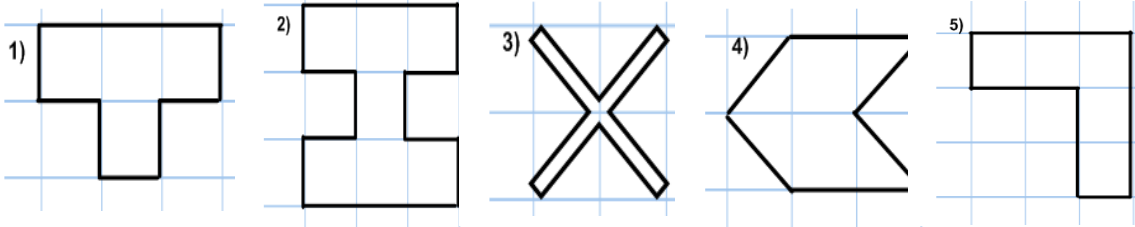
Complete this table indicating the homework you have been set and when it is due by.

Date	Homework	Due By	Handed In

Please take care of the booklet as you will be required to make a donation to replace it if lost or damaged beyond use.

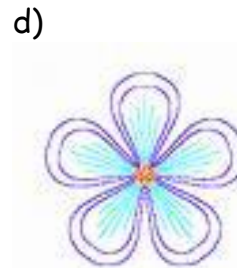
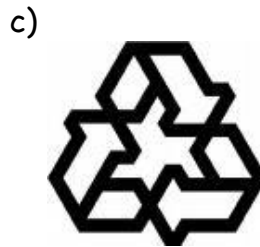
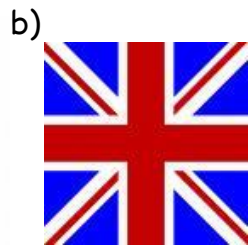
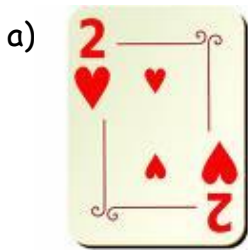
U15 – Transformations
Symmetry
No Calculator Allowed

Reflective Symmetry draw in their lines of reflective symmetry.



Rotation Symmetry

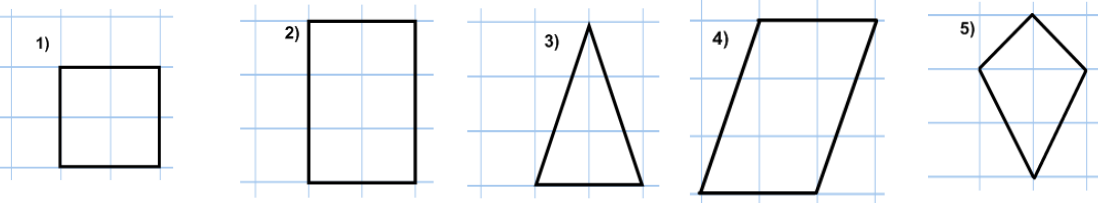
1. Write down the order of rotation of the following images.



For each shape

- (i) write the name of the shape
- (ii) draw on all the lines of reflective symmetry
- (iii) write the order of rotation

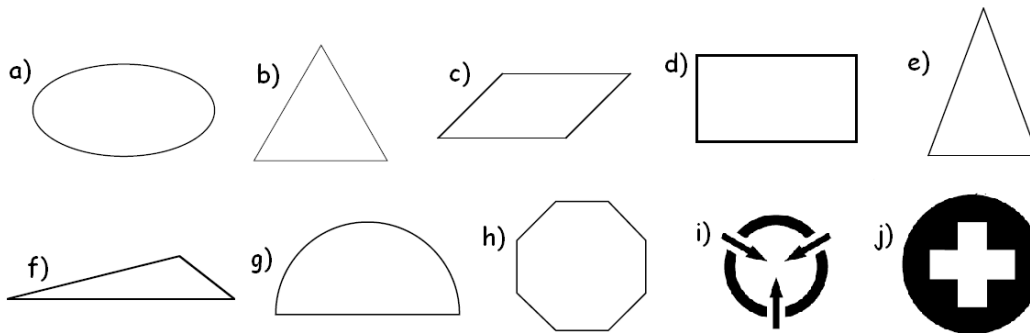
NAMES:



ORDER OF ROTATION

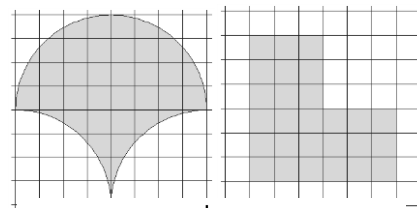
U15 – Transformations
Symmetry
No Calculator Allowed

1) Under each diagram write if the shape has **line symmetry** or **no line symmetry**. If it has line symmetry draw on the lines of symmetry.

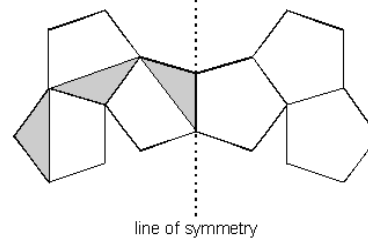


2) Which of the shapes above have rotational symmetry

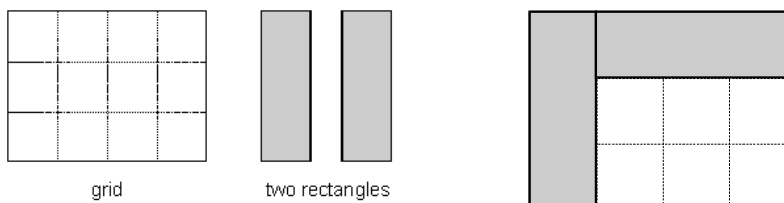
3) These two shapes are drawn on square grids. Each shape has one line of symmetry. Draw the line of symmetry on each shape.



4) Shade 3 triangles so that the dashed line is a line of symmetry (a mirror line).



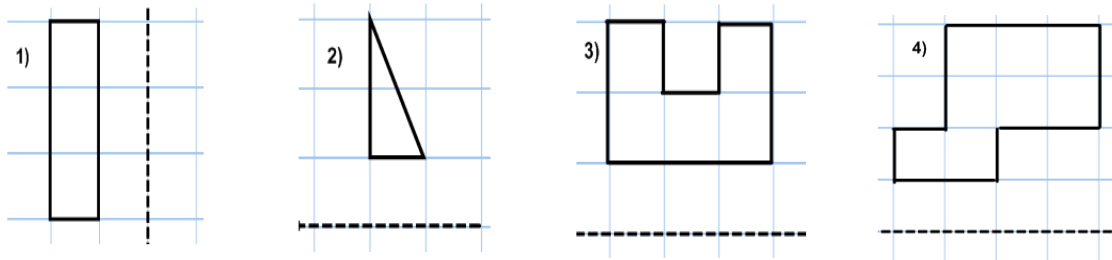
3) I have a square grid and two rectangles. I make a pattern with the grid and the two rectangles. The pattern has no lines of symmetry.



Copy the **grid** and place **both** rectangles on the grid to make a pattern with two lines of symmetry. You must shade the rectangles.

U15 – Transformations
Reflect and Rotate
No Calculator Allowed

Reflection - reflect it in the dotted line(s).

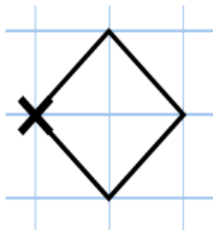


Rotation

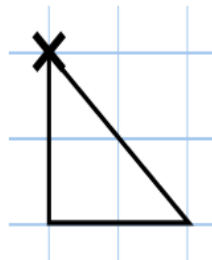
Rotate each shape about the cross.

Make sure you rotate in the direction and angle specified for each question.

1) 90° clockwise

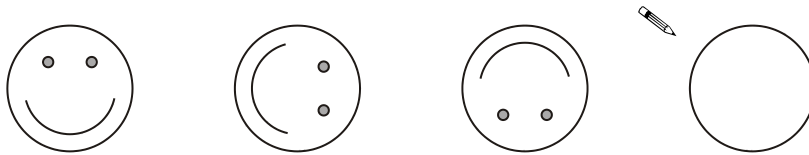


2) 90° anti-clockwise

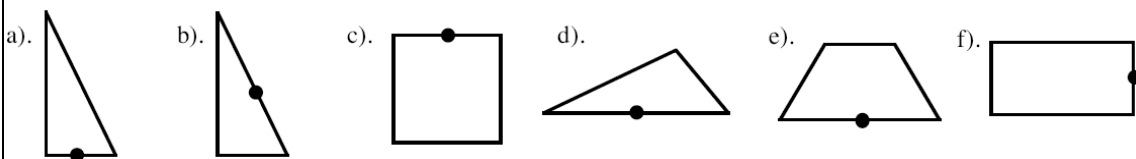


U15 – Transformations
Rotation
No Calculator Allowed

1) The diagram shows a rotating face. The face rotates clockwise through one right angle each time. Complete the last face.

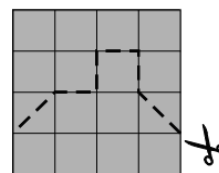


2) Rotate each shape 180° clockwise along the marked side (●) without the use of a mirror.

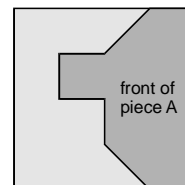


3)

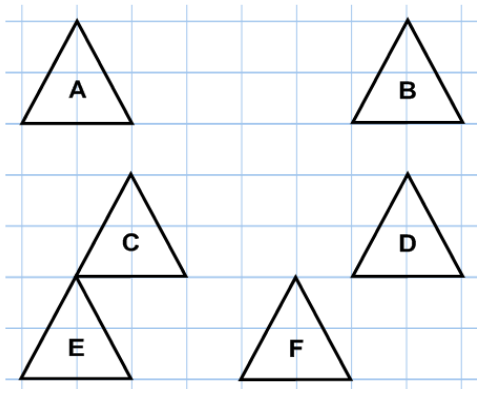
a) I have a square piece of card. I cut along the dashed line to make two pieces of card. Do the two pieces of card have the same area? Explain your answer.



a) The card is shaded grey on the front, and black on the back. I turn piece A over to see its black side. Which of the shapes below shows the black side of piece A?

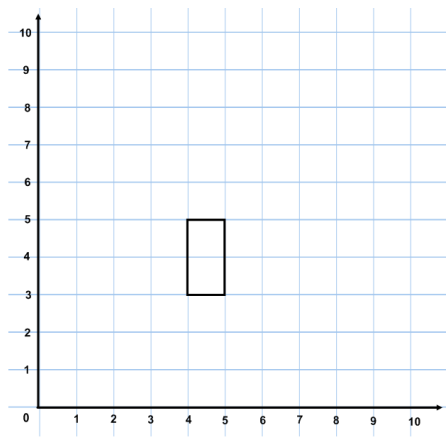


U15 – Transformations
Translations
No Calculator Allowed



Describe the translation of these triangles:

- | | | | |
|-----------|-------|-----------|-------|
| a) A to B | _____ | d) F to E | _____ |
| b) A to E | _____ | e) A to F | _____ |
| c) D to B | _____ | f) D to E | _____ |

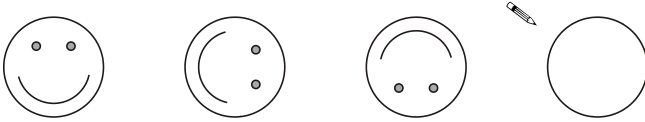


Translate the rectangle as requested.
 Write the question number in each new image you create. Remember to always start from the original rectangle each time.

1. 2 down
2. 3 left
3. 4 up

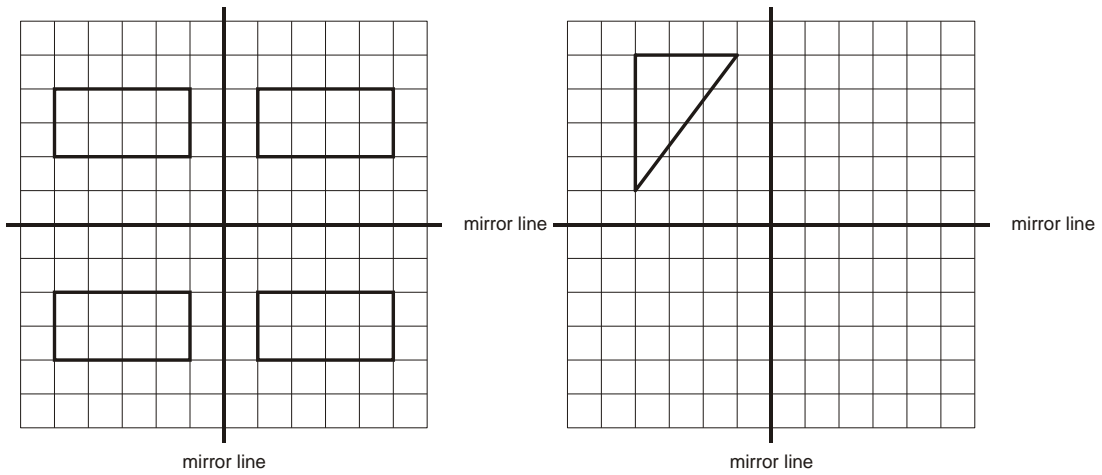
U15 – Transformations
Transformations
No Calculator Allowed

The diagram shows a rotating face. The face rotates clockwise through one right angle each time. Complete the last face.

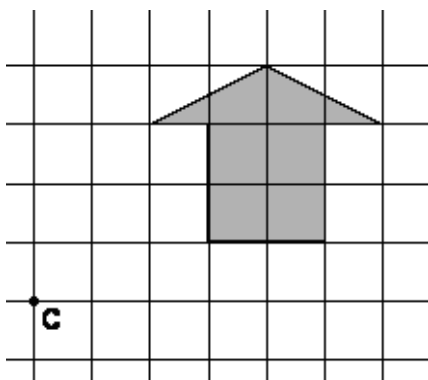


The square grid shows a rectangle reflected in two mirror lines.

Reflect the triangle below in the same way.

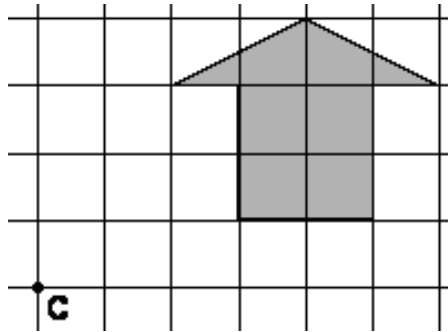


The grid shows an arrow.
 Draw an enlargement of scale factor 2 of the arrow.
 Use point C as the centre of enlargement.

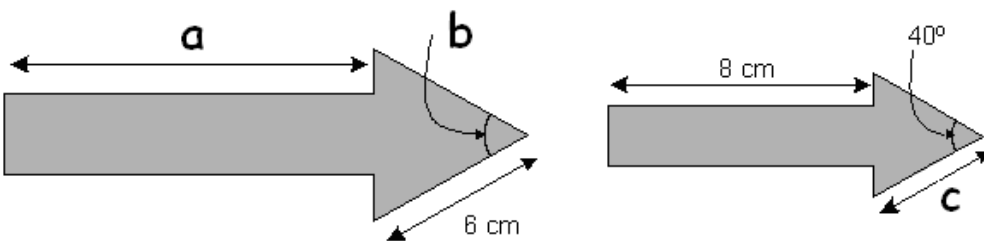


U15 – Transformations
Enlargements
Calculator Allowed

1. The grid shows an arrow. Draw an enlargement of scale factor 2 of the arrow. Use point C as the centre of enlargement.

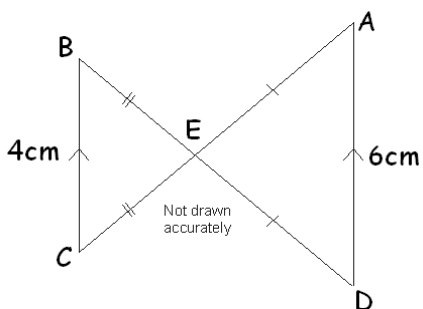


2. The sketch below shows two arrows. The bigger arrow is an enlargement of scale 1.5 of the smaller arrow.



Write down the three missing values.

3. The diagram shows five points joined with four straight lines. BC and AD are parallel. BCE and ADE are isosceles triangles. The total length of the four straight lines is 40 cm. What is the length of EA?

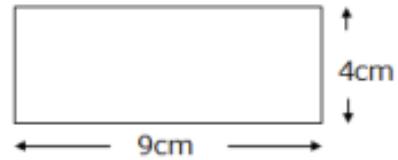


U3 – Transformations and Coordinates

Scale Factors
Calculator Allowed

1.

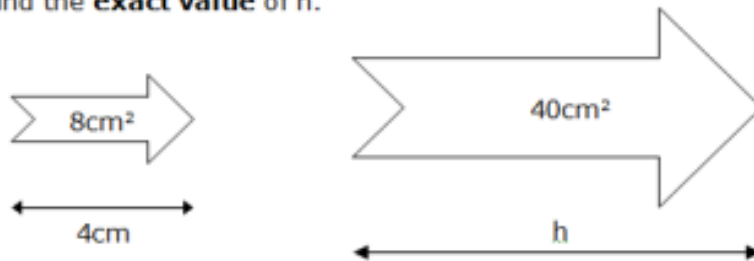
The rectangle on the right is to be enlarged by a scale factor of 2. Complete the statement in the box below:



The area of the original shape is ____ cm^2 . The area of the enlarged shape is ____ cm^2 . Therefore the area of the enlarged shape is ____ times bigger than the original.

2.

The diagram shows two similar arrows. Use the given measurements to find the **exact value** of h .



3.

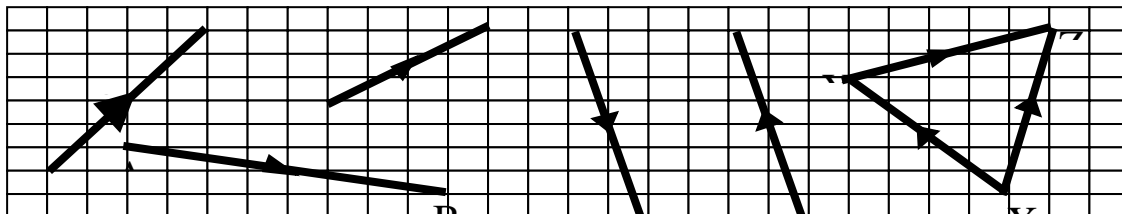
The 'World's Strongest Man' contest includes an entertaining game of lifting concrete spheres of varying sizes. If the smallest sphere has a mass of 100kg and a diameter of 30cm, what is the mass of the largest sphere, which has a diameter of 35.1cm?

U3 – Transformations and Coordinates

Vectors

No Calculator Allowed

1) Write these arrows as column vectors:



2) Draw these vectors as arrows on the grid & Label them

$$\mathbf{b} = \begin{pmatrix} 3 \\ 2 \end{pmatrix} \quad \overrightarrow{PQ} = \begin{pmatrix} 4 \\ -1 \end{pmatrix} \quad \overrightarrow{RS} = \begin{pmatrix} -8 \\ 3 \end{pmatrix} \quad w = \begin{pmatrix} -2 \\ -7 \end{pmatrix}$$

3) If $p = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ and $q = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$

Find:

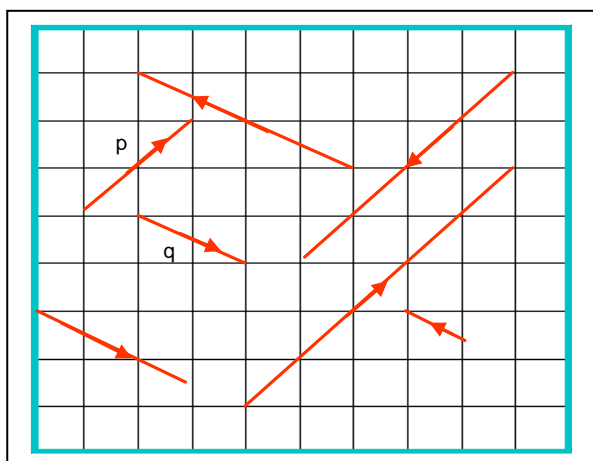
$2p$

$3q$

$3p + 4q$

$5p - 2q$

4) Write the following vectors in terms of p and q



U3 – Transformations and Coordinates

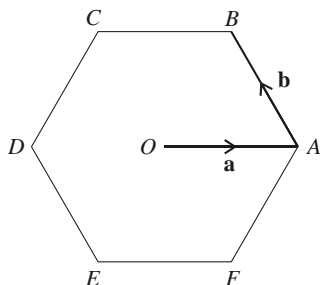
Vectors

No Calculator Allowed

1. $ABCDEF$ is a regular hexagon with centre O .

$$\vec{OA} = \mathbf{a} \text{ and } \vec{AB} = \mathbf{b}$$

Diagram drawn accurately



(a) Find expressions, in terms of \mathbf{a} and \mathbf{b} , for

(i) \vec{OB}

(ii) \vec{AC}

(iii) \vec{EC}

(b) The positions of points P and Q are given by the vectors

$$\vec{OP} = \mathbf{a} - \mathbf{b} \quad \vec{OQ} = \mathbf{a} + 2\mathbf{b}$$

(i) Draw and label the positions of points P and Q on the diagram.

(ii) Hence, or otherwise, deduce an expression for \vec{PQ} .

2. $OPQR$ is a parallelogram. M is the mid-point of the diagonal OQ .

$$\vec{OP} = 2\mathbf{p} \text{ and } \vec{OR} = 2\mathbf{r}$$

Express \vec{OM} in terms of \mathbf{p} and \mathbf{r} .

