



# Year 8 Knowledge Organiser - Transformations

## Key Vocabulary

**Congruent** - two figures or objects are congruent if they have the same shape and size, or if one has the same shape and size as the mirror image of the other

**Rotation** - the motion of a shape around a fixed point

**Reflection** - an image of a shape as it would be seen in a mirror

**Translation** - transformation that moves every point of a figure or a space by the same distance in a given direction

**Vector** - describes movement from one point to another. They have both direction and magnitude (size)

**Enlargement** - to enlarge a shape, a centre of enlargement is required. When a shape is enlarged from a centre of enlargement, the distances from the centre to each point are multiplied by the scale factor

## Translation and vector notation

**Vector Notation**  $\rightarrow \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

How far left or right to move  
Negative value (left)  
Positive value (right)

**Translation**  $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$

How far up or down to move  
Negative value (down)  
Positive value (up)

Original shape

Every vertex has been translated by the same amount

## Compare rotations and reflections

Reflections are a mirror image of the original shape.

Information needed to perform a reflection  
- Line of reflection (Mirror line)

Rotations are the movement of a shape in a circular motion

Information needed to perform a rotation  
- Point of rotation  
- Direction of rotation  
- Degrees of rotation

## Objectives

Identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement

## Reflect horizontally/ vertically (1)

Reflection in a vertical line

Reflection in a horizontal line

Note: a reflection doubles the area of the original shape

Reflection on an axis grid

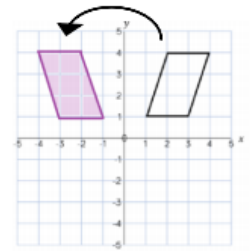
Reflection in the line  $x=2$

Reflection in the line  $y=2$

## Reflect horizontally/ vertically (2)

All points need to be the same distance away from the line of reflection

Reflection in the line  $y$  axis - this is also a reflection in the line  $x=0$



## Lines parallel to the x and y axes

REMEMBER

Lines parallel to the x-axis are  $y = \dots$

Lines parallel to the y-axis are  $x = \dots$

## Reflect Diagonally (1)

Points on the mirror line don't change position

Turn your image: If you turn your image it becomes a vertical/ horizontal reflection (also good to check your answer the way)

Drawing perpendicular lines  
Perpendicular lines to and from the mirror line can help you to plot diagonal reflections

Fold along the line of symmetry to check the direction of the reflection

## Reflect Diagonally (2)

This is the line  $y=x$  (every y coordinate is the same as the x coordinate along the line)

This is the line  $y=-x$  (The x and y coordinate have the same value but opposite sign)

Turn your image: If you turn your image it becomes a vertical/ horizontal reflection (also good to check your answer the way)

## Congruent figures

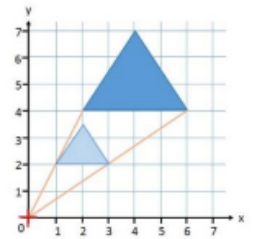
Congruent figures are identical in size and shape - they can be reflections or rotations of each other

Congruent shapes are identical - all corresponding sides and angles are the same size

Because all the angles are the same and  $OC=OM$ ,  $BC=LM$  triangles  $OBC$  and  $OLM$  are congruent

## Enlargement

Sometimes called scaling, is a transformation which changes the size of an object.



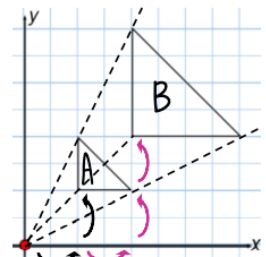
## Positive scale factors

Enlargement from a point

Enlarge shape A by SF 2 from (0,0)

The shape is enlarged by 2

The distance from the point enlarges by 2



## Rotate from a point (in a shape)

Original shape

Point of rotation

Image  $90^\circ$  clockwise

- Trace the original shape (mark the point of rotation)
- Keep the point in the same place and turn the tracing paper
- Draw the new shape

Clockwise    Anti-Clockwise

## Rotate from a point (outside a shape)

Original shape

Point of rotation

Image  $90^\circ$  anti-clockwise

- Trace the original shape (mark the point of rotation)
- Keep the point in the same place and turn the tracing paper
- Draw the new shape

To find the **scale factor** of an enlargement: Identify 2 corresponding sides and divide to find the scale factor. Then join corners of the 2 shapes and extend to find the centre of enlargement.

To find the **centre of enlargement**, draw lines through the corresponding corners of each shape. These lines will cross at the centre of enlargement.