Year 7 Knowledge Organiser – Transformations

Objectives

Solve geometrical problems on coordinate axes

Identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation

Describe translations as 2D vectors

Identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation

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

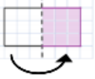
Rotation – the motion of a shape around a fixed point

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

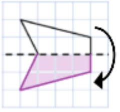
Vector – describes movement from one point to another. They have both direction and magnitude (size)

Reflect horizontally/ vertically (1)



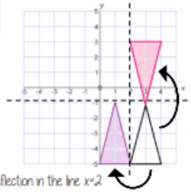
Note: a reflection doubles the area of the original shape

Reflection in a vertical line



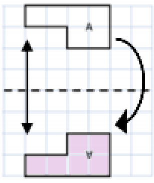
Reflection in a horizontal line

Reflection on an axis grid

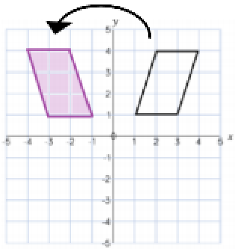


Reflect horizontally/ vertically (2)

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 axis

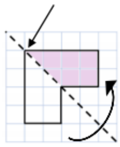
REMEMBER

Lines parallel to the x-axis are y = ____

Lines parallel to the y-axis are x = ____

Reflect Diagonally (1)

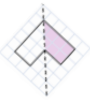
Points on the mirror line don't change position

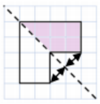


Fold along the line of symmetry to check the direction of the reflection

Turn your image

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



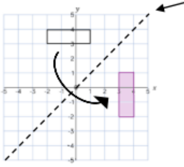


Drawing perpendicular lines

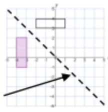
Perpendicular lines to and from the mirror line can help you to plot diagonal reflections

Reflect Diagonally (2)

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



This is the line **y = −x** The x and y coordinate have the same value but opposite sign

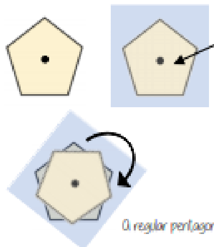


Turn your image

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

Rotational Symmetry

Tracing paper helps check rotational symmetry



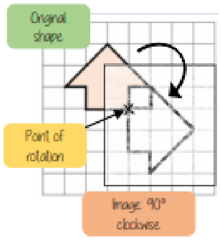
1 Trace your shape (mark the centre point)

2 Rotate your tracing paper on top of the original through 360°

3 Count the times it fits back into itself

A regular pentagon has rotational symmetry of order 5

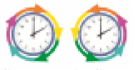
Rotate from a point (in a shape)



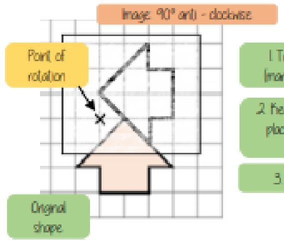
1 Trace the original shape (mark the point of rotation)

2 Keep the point in the same place and turn the tracing paper

3 Draw the new shape



Rotate from a point (outside a shape)



1 Trace the original shape (mark the point of rotation)

2 Keep the point in the same place and turn the tracing paper

3 Draw the new shape

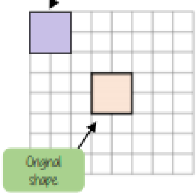
Translation and vector notation

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

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

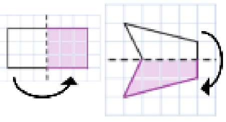
How far up or down to move
Negative value (down)
Positive value (up)

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



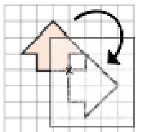
Every vertex has been translated by the same amount

Compare rotations and reflections



R Reflections are a mirror image of the original shape

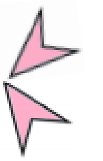
Information needed to perform a reflection
- Line of reflection (Mirror line)



Rotations are the movement of a shape in a circular motion

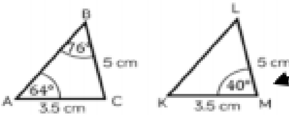
Information needed to perform a rotation
- Point of rotation
- Direction of rotation
- Degrees of rotation

Congruent figures



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

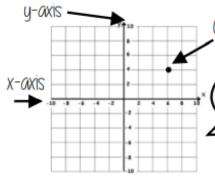
Congruent shapes are identical – all corresponding sides and angles are the same size



$A\hat{C}B = K\hat{M}L$

Because all the angles are the same and AC=KM BC=LM triangles ABC and KLM are **congruent**

Coordinates in four quadrants



Coordinate (x, y) (6, 4)

From the origin this coordinate is 6 places along the positive x axis and 4 places up the positive y axis.

(x, y)

Always the position on the x axis first

Always the position on the y axis second

(0, a) Will be always be a point on the y axis (a can be any number)

(a, 0) Will be always be a point on the x axis (a can be any number)