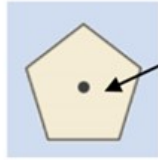
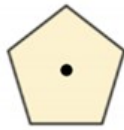


Y10 FOUNDATION HT3 Transformations

Rotational Symmetry

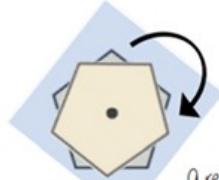
Tracing paper helps check rotational symmetry



1 Trace your shape (mark the centre point)

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

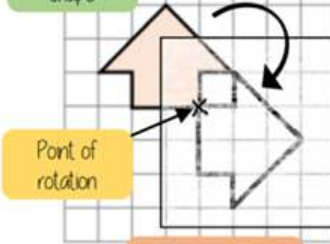
3 Count the times it fits back into itself



A regular pentagon has rotational symmetry of order 5

Rotate from a point (in a shape)

Original shape



Point of rotation

Image 90° clockwise

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

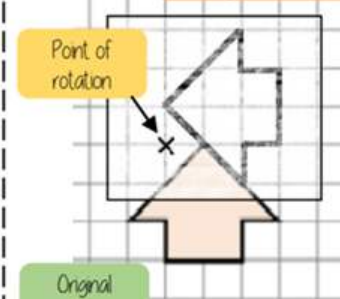


Clockwise

Anti-Clockwise

Rotate from a point (outside a shape)

Image 90° anti-clockwise



Point of rotation

Original 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

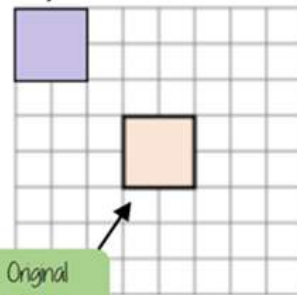
Vector Notation

$$\begin{pmatrix} 1 \\ -2 \end{pmatrix}$$

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)

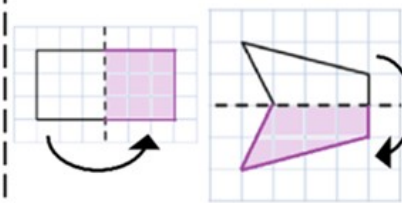
Translation $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$



Original shape

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:

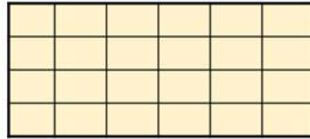
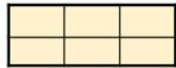
- Point of rotation
- Direction of rotation
- Degrees of rotation

Y10 FOUNDATION HT3 Transformations

Recognise enlargement & similarity

Shapes are similar if all pairs of corresponding sides are in the same ratio

These shapes are similar because all sides are increased by the same ratio

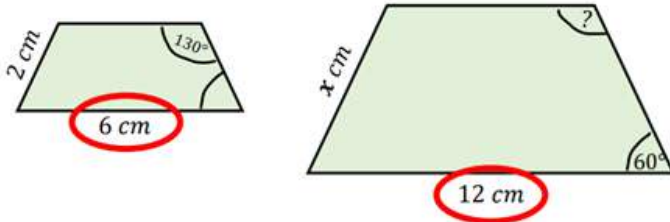


Enlargements are similar shapes with a ratio other than 1

Calculations in similar shapes

Don't forget that properties of shapes don't change with enlargements or in similar shapes

The two trapezium are similar find the missing side and angle



Corresponding sides identify the scale factor

$$\frac{12}{6} = 2 \quad \text{Scale Factor} = 2$$

Calculate the missing side

Length (corresponding side) \times scale factor

$$2\text{ cm} \times 2$$

$$x = 4\text{ cm}$$

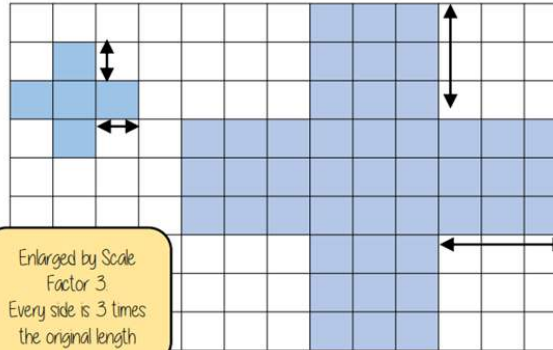
Enlargement does not change angle size

Calculate the missing angle

Corresponding angles remain the same
 130°

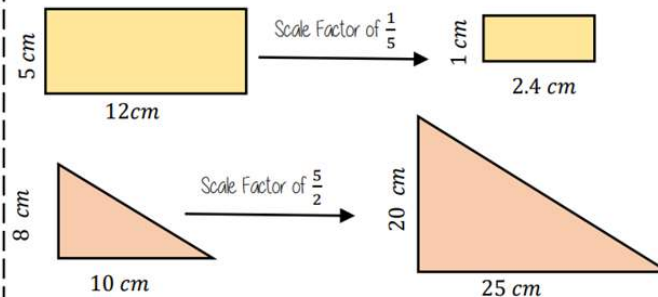
Enlarge by a positive scale factor

With a scale factor larger than 1 it makes the shape bigger



Positive fractional scale factor

With a scale factor between 0 and 1 it makes the shape smaller



Keywords

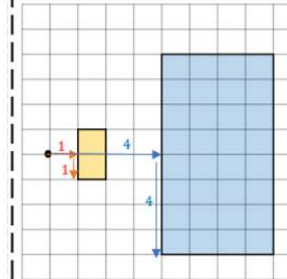
Similar shapes: shapes of different sizes that have corresponding sides in equal proportion and identical corresponding angles.

Scale factor: the multiple describing how much a shape has been enlarged.

Enlarge: to change the size of a shape.

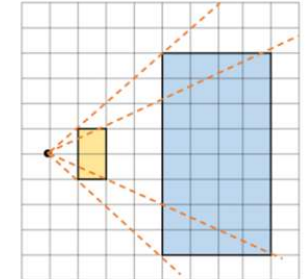
Enlarge a shape from a point

Scaled distances method



Scale the distance between the point of enlargement and each corresponding vertices

Rays method



Multiply the distance from the centre of corresponding vertices by the scale factor along the ray

Keywords

Rotate: a rotation is a circular movement.

Symmetry: when two or more parts are identical after a transformation.

Regular: a regular shape has angles and sides of equal size.

Invariant: a point that does not move after a transformation.

Vertex: a point where two edges meet.

Horizontal: from side to side.

Vertical: from up to down.