

Enlargements

Notes

When an object is enlarged, its shape stays the same but its size changes.

Drawing enlargements

The first point on the image is the hardest to locate but once we have this point we can often use the size of the image as a guide.

When locating the first point of the image, we always measure the distance *from the centre of enlargement*.

E.g. 1 Enlarge the shape with coordinates $A(3, 6)$, $B(4, 6)$, $C(4, 3)$ and $D(3, 3)$ by a scale factor of 3 about the centre $(1, 4)$.

Working: (Diagrams for each step are below)

Step 1: Draw construction lines through the centre of enlargement and each point.

These are the green lines on the diagram below.

Step 2: Locate the 1st point

Measure the distance (or count the squares) from centre to the point. Multiply this by the scale factor.

In the example below, *from the centre of enlargement* to the blue point on the shape is 2 squares to the right and 2 up. So the distance to the image *from the centre of enlargement* will be 6 squares to the right and 6 up.

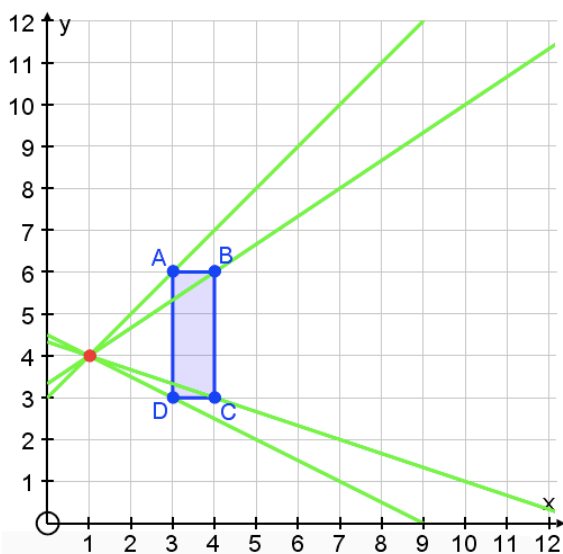
Step 3: Locate the other points of the shape

Either use the same method as described in step 2 or use the size of the image. To locate B' , it had to be on the construction line and horizontally across from A' .

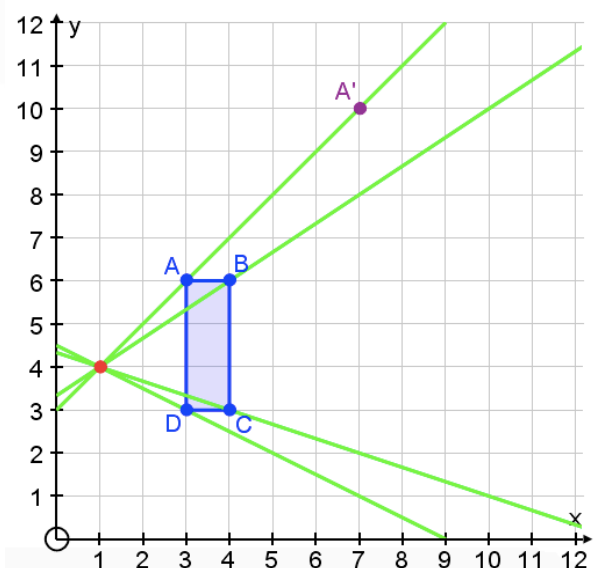
Notation: We use the ' to indicate a point on the image. So P could be a point on the object and P' is the corresponding point on the image

Step 4: Connect up the points of the image to form the shape

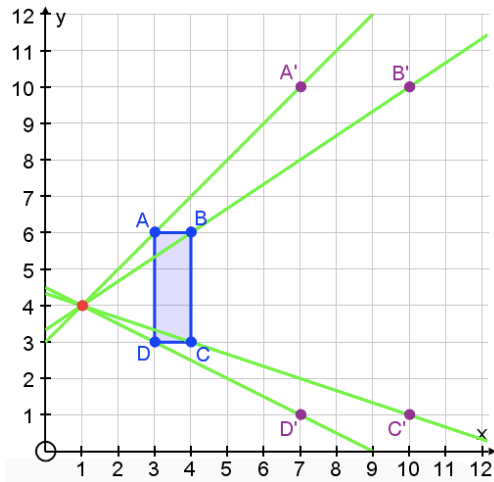
Step 1 – draw construction lines



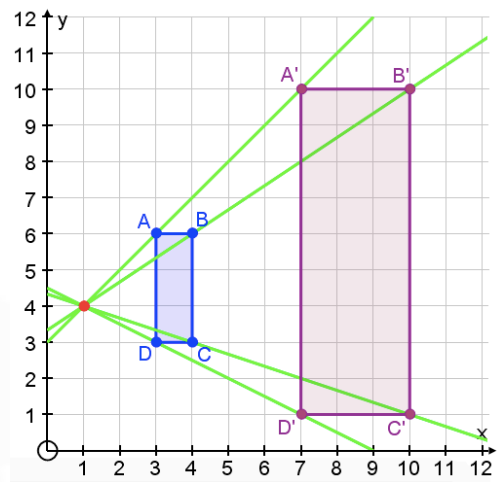
Step 2 – locate the first point



Step 3 – locate the other points



Step 4 – form the image $A'B'C'D'$

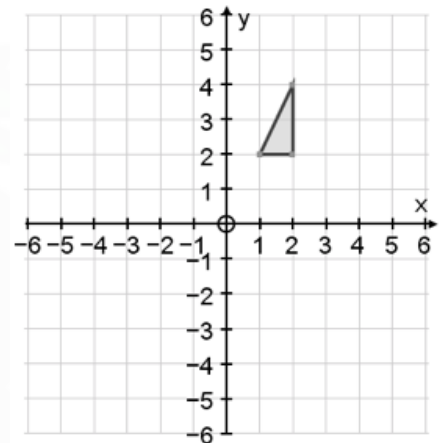


Video:
Video:

[Enlargements \(positive scale factor\)](#)
[Enlargements \(fractional scale factor\)](#)

E.g. 2 Enlarge the shape:

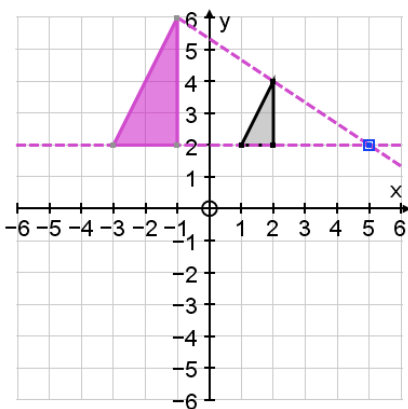
- (a) by a factor of 2 with centre (5, 2).
Label the image X .
- (b) by a factor of 3 with centre (4, 6).
Label the image Y .
- (c) by a factor of $\frac{1}{2}$ with centre (4, -6).
Label the image Z .



Working:

N.B. The image (i.e. the answer) is in **pink** and the centre of enlargement is in **blue**.

- (a) (b) (c)



N.B. When the scale factor > 1 , the object is between centre of enlargement and the image.
When the $0 < \text{scale factor} < 1$, the image is between centre of enlargement and the object.

Finding the centre and scale factor of the enlargement

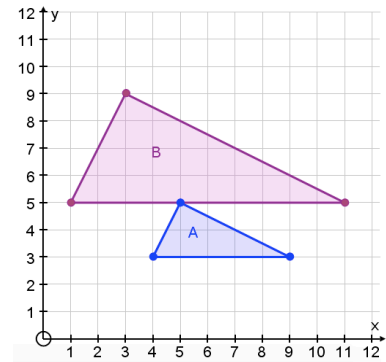
To describe an enlargement you need to state:

- Enlargement
- The scale factor
- The centre of enlargement.

The scale factor is given by:

$$\text{Scale factor} = \frac{\text{Length on image}}{\text{Length on object}}$$

E.g. 3 Describe the transformation shown in the diagram that takes shape A onto shape B.



Working:

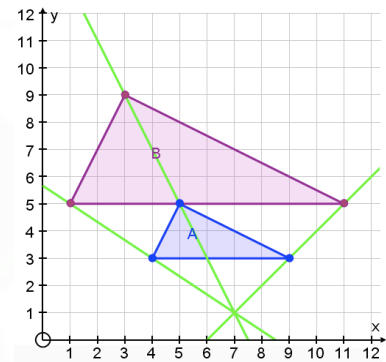
Step 1: Work out the scale factor

Looking at the horizontal length on both triangles, A has length 5 units and B has length 10 units

$$\text{Scale factor} = \frac{10}{5} = 2$$

Step 2: Find the centre of enlargement

Draw 2 construction lines through 2 sets of corresponding points. The construction lines intersect at the centre of enlargement i.e. (7, 1)

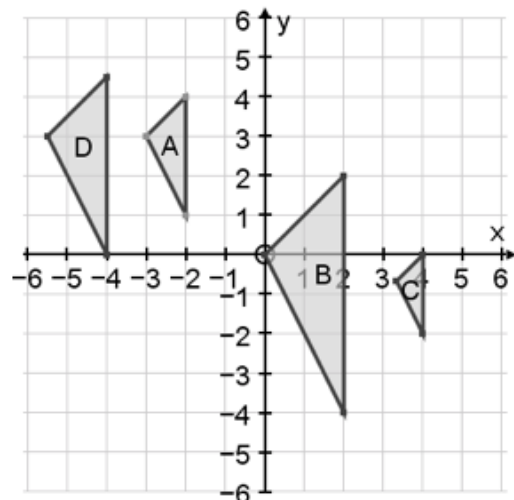


The final answer is:

An enlargement, scale factor 2, centre (7, 1).

E.g. 4 Describe the transformation that takes:

- (a) triangle A to triangle D
- (b) triangle A to triangle B
- (c) triangle B to triangle C



Video: [Describing enlargements](#)
 Video: [Finding the centre of enlargement](#)

Exercise

9-1 class textbook:	p285 M9.6 Qu 1-17
A*-G class textbook:	p247 M9.6 Qu 1-17
9-1 homework book:	p98 M9.6 Qu 1-6
A*-G homework book:	p70 M9.6 Qu 1-6

Summary

Drawing enlargements

Step 1: Draw construction lines through the centre of enlargement and each point.

Step 2: Locate the 1st point

Step 3: Locate the other points of the shape

Step 4: Connect up the points of the image to form the shape

To describe an enlargement you need to state:

- Enlargement
- The scale factor
- The centre of enlargement.

The scale factor is given by: $\text{Scale factor} = \frac{\text{Length on image}}{\text{Length on object}}$

To find the centre of enlargement — draw construction lines through two sets of corresponding points. The construction lines intersect at the centre of enlargement.

[Homework book answers \(only available during a lockdown\)](#)