

Enlargements

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.

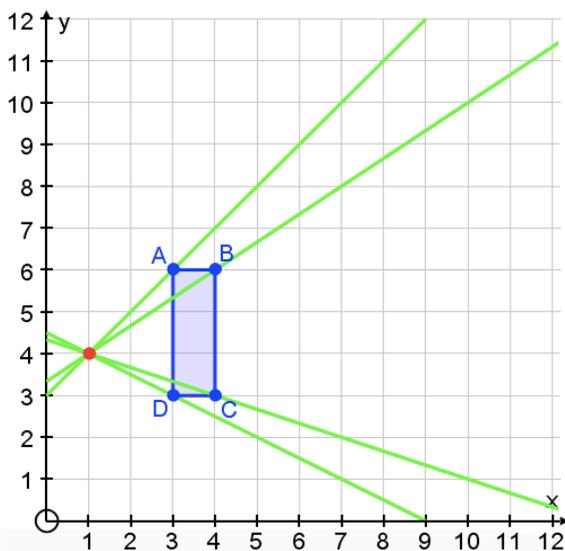
Step 3: Locate the other points of the shape

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' .

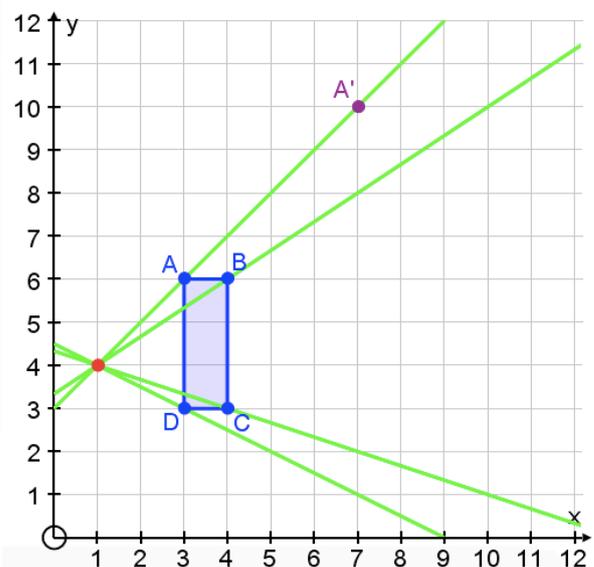
Notation: We use the ' to indicate a point on the image. So P could be a point on the object and P' is the corresponding point on the image

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

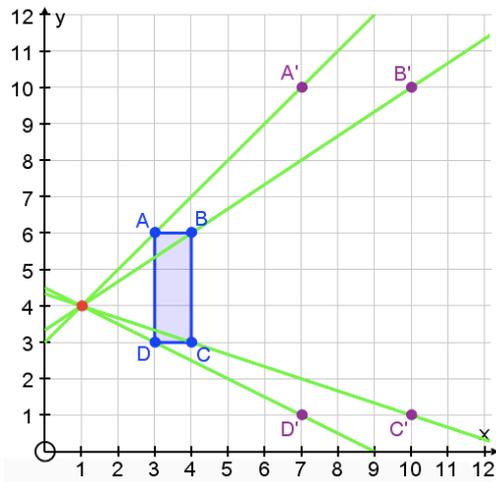
Step 1 — draw construction lines



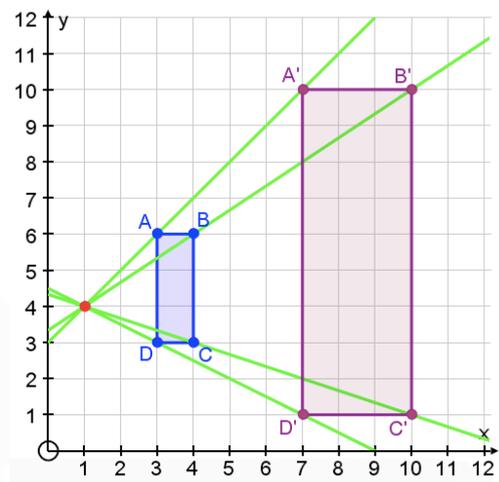
Step 2 — locate the first point



Step 3 — locate the other points



Step 4 — form the image A'B'C'D'

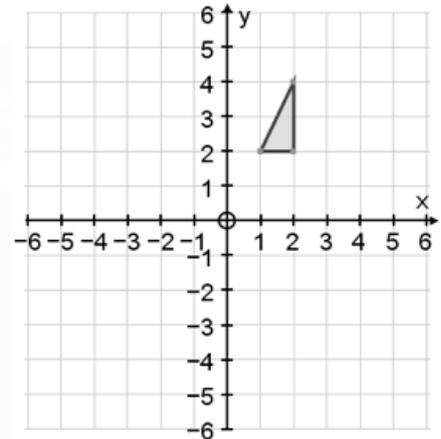


Video:
Video:

[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*.



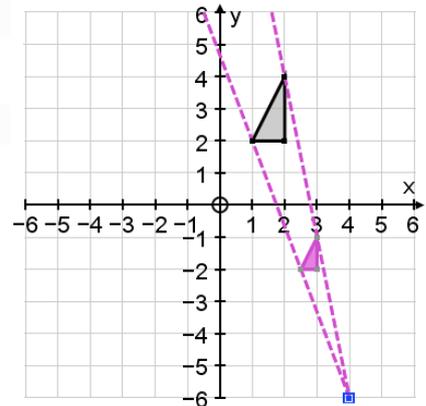
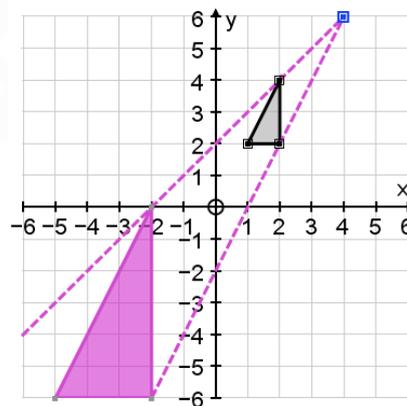
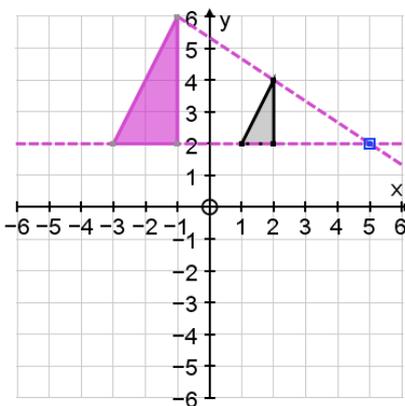
Working:

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

(a)

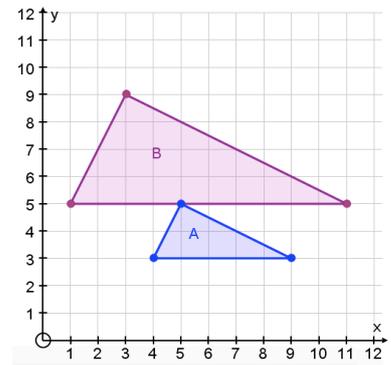
(b)

(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.

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



Working:

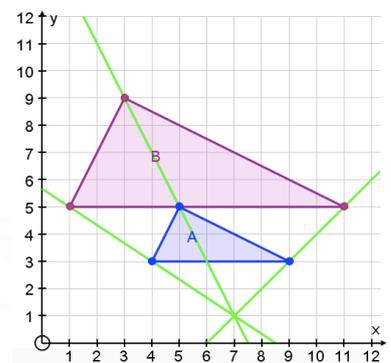
Step 1: Work out the scale factor

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)

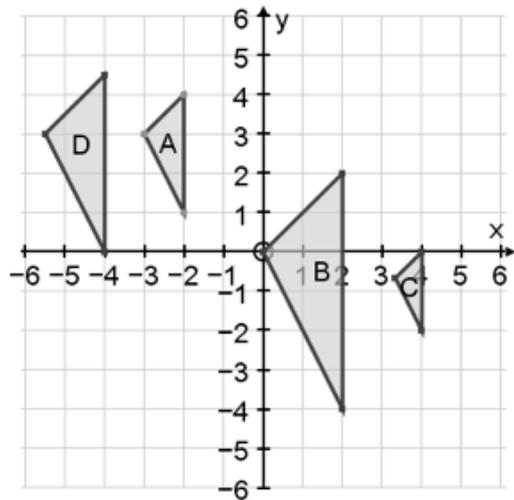


The final answer is:

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*



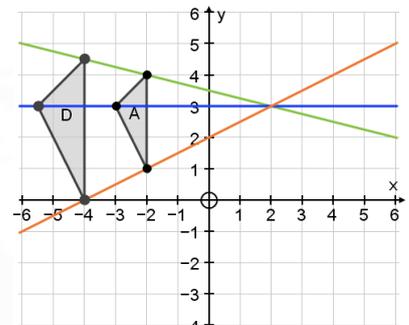
Working:

(a) **From A to D**

The construction lines converge on (2, 3) so this is the centre of enlargement.

The height of the vertical side on A is 3 units and on D it is 4.5 units. The scale factor is $\frac{4.5}{3} = 1.5$

A to D is an enlargement scale factor 1.5, centre (2, 3).

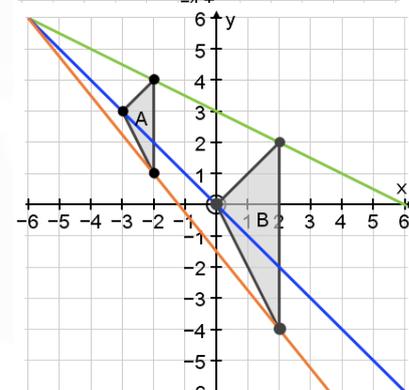


(b) **From A to B**

The construction lines converge on (-6, 6) so this is the centre of enlargement.

The height of the vertical side on A is 3 units and on B it is 6 units. The scale factor is $\frac{6}{3} = 2$

A to B is an enlargement scale factor 2, centre (-6, 6).

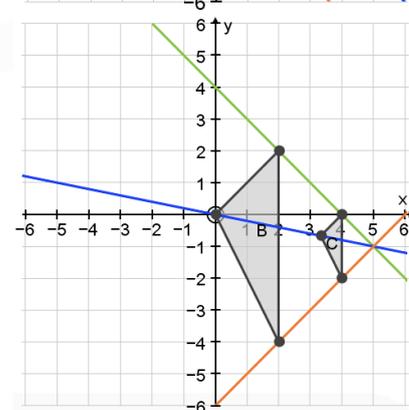


(c) **From B to C**

The construction lines converge on (5, -1) so this is the centre of enlargement.

The height of the vertical side on B is 6 units and on C it is 2 units. The scale factor is $\frac{2}{6} = \frac{1}{3}$

A to D is an enlargement scale factor $\frac{1}{3}$, centre (5, -1).



Video: [Enlargements \(positive scale factor\)](#)
Video: [Enlargements \(fractional scale factor\)](#)
Video: [Describing enlargements](#)
Video: [Finding the centre of enlargement](#)

[Solutions to Starter and E.g.s](#)

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

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

