Planner

Enlargement

- Enlarging a shape using negative and fractional scale factors
- Finding the scale factor of enlargement
- Finding the centre of enlargement
- Finding area and volume scale factors

Keywords

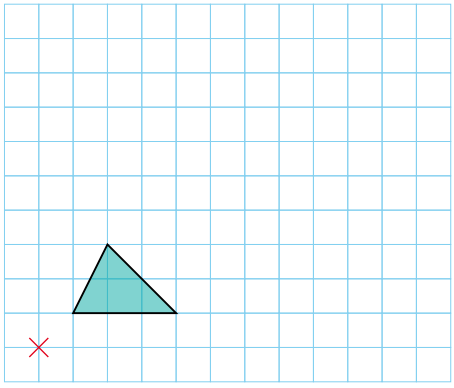
You should know

explanation 1a explanation 1b

1 In each diagram an object and a centre of enlargement are shown.

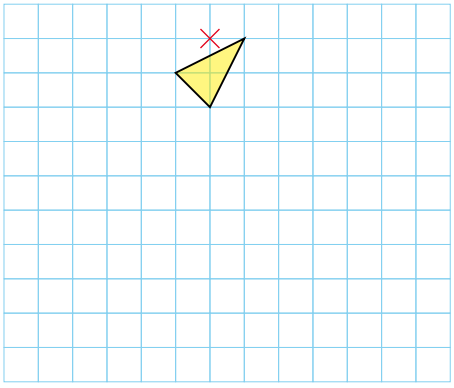
Copy each diagram and enlarge the object, using the given scale factor.

a



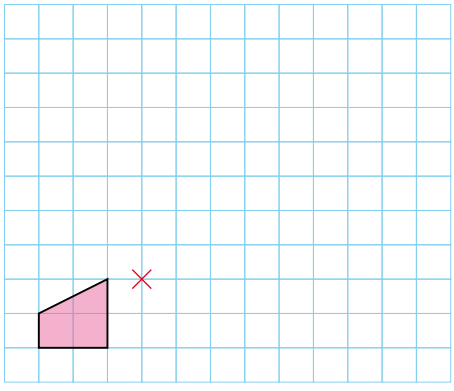
Scale factor 3

b



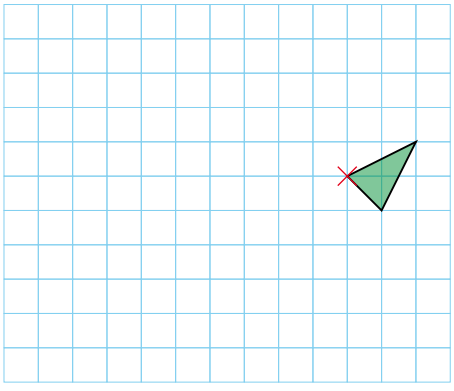
Scale factor 4

c



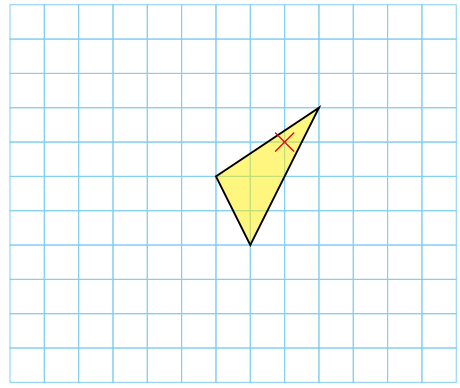
Scale factor −2

d



Scale factor −4

2 The diagram shows an object and a centre of enlargement.



a Copy the diagram. Enlarge the shape, using the marked centre of enlargement and a scale factor of 3.

b Copy the diagram. Enlarge the shape, using the marked centre of enlargement and a scale factor of −2.

3 **a** Draw x- and y-axes from 0 to 10.

b Plot and join the points (1, 5), (3, 4), (4, 6) and (2, 7).

c Enlarge the shape by a scale factor 2, centre (6, 0).

4 **a** Draw x- and y-axes from −8 to +5.

b Plot and join the points (1, 3), (4, 2) and (3, 5).

c Enlarge the shape by a scale factor of −2, centre (0, 1).

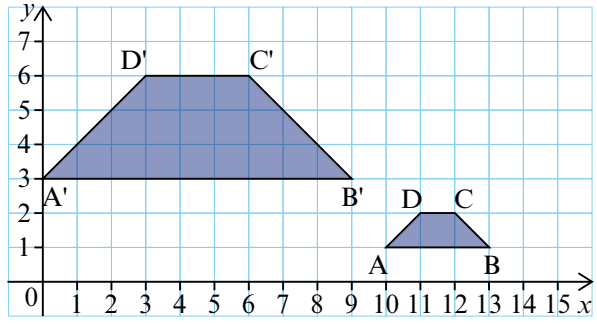
5 An object and its image are shown on each set of axes.

For each diagram, find:

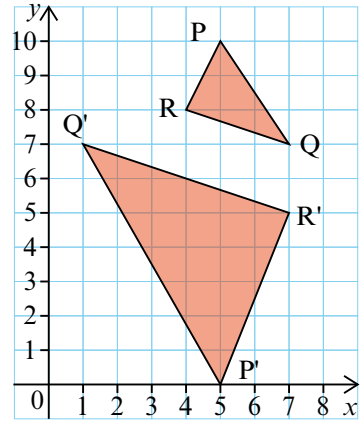
i the scale factor of the enlargement

ii the centre of the enlargement

a



b

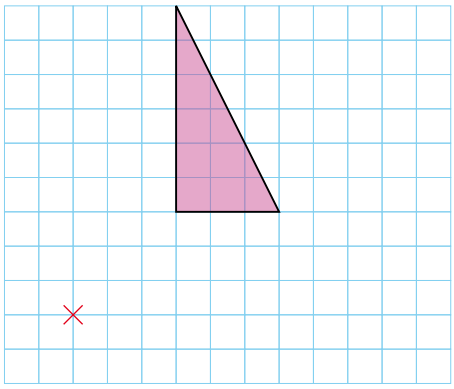


explanation 2a | explanation 2b | online

6 In each diagram an object and a centre of enlargement are shown.

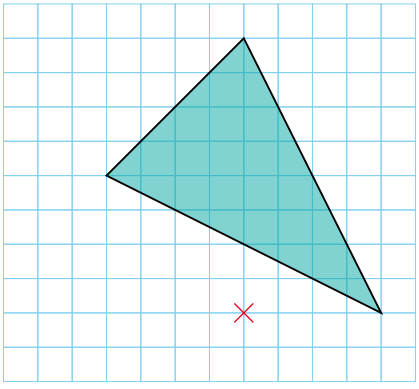
Copy each diagram and enlarge the object, using the given scale factor.

a



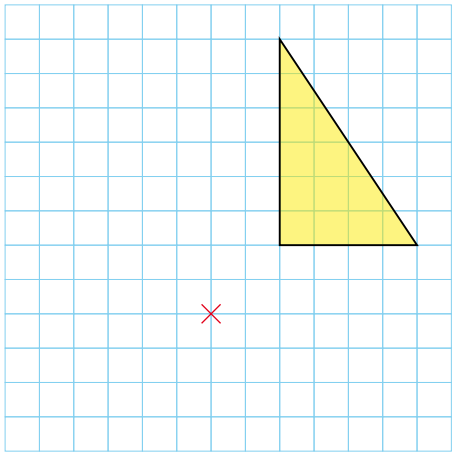
Scale factor $\frac{1}{3}$

b



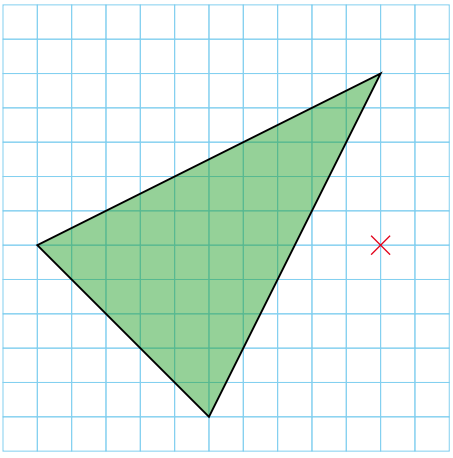
Scale factor $\frac{1}{4}$

c



Scale factor $-\frac{1}{2}$

d



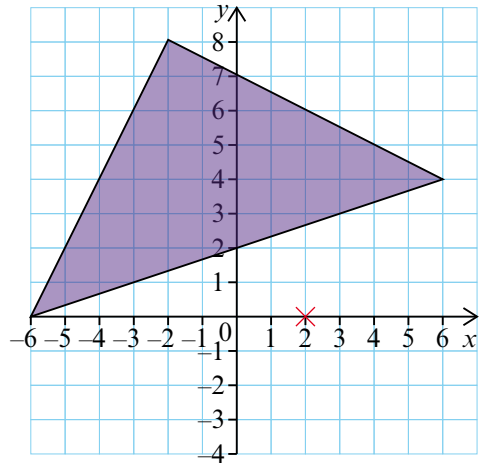
Scale factor $-\frac{1}{5}$

7 **a** Copy the diagram. Enlarge the shape, using the marked centre of enlargement and these scale factors.

i $\frac{1}{2}$ **ii** $\frac{1}{4}$

b Copy the diagram. Enlarge the shape, using the marked centre of enlargement and these scale factors.

i $-\frac{1}{2}$ **ii** $-\frac{1}{4}$



8 **a** Draw x- and y-axes from −3 to 7.

b **i** Plot the points P (2, −2), Q (6, 2), R (2, 6), S (−2, 2).

ii Join the points to form the square PQRS.

c **i** Plot the points P' (2, 1), Q' (3, 2), R' (2, 3), S' (1, 2).

ii Join the points to form square P'Q'R'S'.

d Describe fully the transformation that will map PQRS to P'Q'R'S'.

e Describe fully the transformation that will map P'Q'R'S' to PQRS.

9 **a** Draw x- and y-axes from −3 to 7.

b Plot the points A (3, 3), B (6, 6), C (0, 6).

Join the points to form triangle ABC.

c Plot the points A' (−1, −1), B' (−2, −2) and C' (0, −2).

Join the points to form triangle A'B'C'.

d Describe fully the transformation that will map ABC to A'B'C'

e Describe fully the transformation that will map A'B'C' to ABC.

explanation 3a | explanation 3b | explanation 3c | explanation 3d

10 A rectangle has an area of $12\,cm^2$.
The sides of the rectangle are enlarged by a scale factor of 2.

a Write the scale factor for the enlargement of the area.

b Work out the area of the enlarged rectangle.

c Sketch a rectangle. Label the length and width so that the area is $12\,cm^2$.

d Enlarge the sides of your rectangle by a scale factor of 2. Sketch the image.

e Work out the area of your enlarged rectangle.
Check that your answer is the same as that for **b**.

11 A triangle has an area of $10\,cm^2$.
The sides of the triangle are enlarged by a scale factor of 3.

a Write the scale factor for the enlargement of the area.

b Work out the area of the enlarged triangle.

c Sketch a triangle. Label the base and perpendicular height so that the area is $10\,cm^2$.

d Enlarge the lengths in your triangle by a scale factor of 3. Sketch the image.

e Work out the area of your enlarged triangle.
Check that your answer is the same as that for **b**.

12 A cuboid has a volume of $40\,cm^3$.
All the lengths of the cuboid are enlarged by a scale factor of 3.

a Write the scale factor for the enlargement of the volume.

b Work out the volume of the enlarged cuboid.

c The dimensions for the original cuboid are 4 cm, 2 cm and 5 cm.
Enlarge these by a scale factor of 3.

d Work out the volume of the enlarged cuboid.
Check that this is the same as your answer to **b**.

13 Trapezium P has an area of $20\,cm^2$.
Trapezium Q is an enlargement of trapezium P.
All the lengths of P are enlarged by a scale factor of $\frac{3}{2}$.
What is the area of Q?