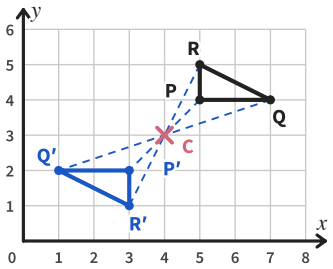
Enlargement by a negative scale factor

ANSWERS

1

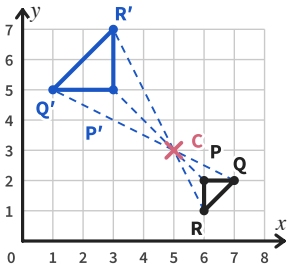
Enlarge the shape by scale factor **−1** about the centre **C (4, 3)**.



Vertex	Journey from C	Journey × −1	New vertex
P (5, 4)	right 1, up 1	left 1, down 1	P′ (3, 2)
Q (7, 4)	right 3, up 1	*left 3, down 1*	*Q′ (1, 2)*
R (5, 5)	right 1, up 2	*left 1, down 2*	*R′ (3, 1)*

2

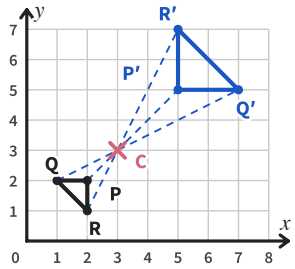
Enlarge the shape by scale factor **−2** about the centre **C (5, 3)**.



Vertex	Journey from C	Journey × −2	New vertex
P (6, 2)	right 1, down 1	*left 2, up 2*	*P′ (3, 5)*
Q (7, 2)	right 2, down 1	*left 4, up 2*	*Q′ (1, 5)*
R (6, 1)	right 1, down 2	*left 2, up 4*	*R′ (3, 7)*

3

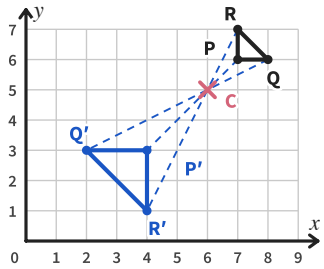
Enlarge the shape by scale factor **−2** about the centre **C (3, 3)**.



Vertex	Journey from C	Journey × −2	New vertex
P (2, 2)	left 1, down 1	*right 2, up 2*	*P′ (5, 5)*
Q (1, 2)	*left 2, down 1*	*right 4, up 2*	*Q′ (7, 5)*
R (2, 1)	*left 1, down 2*	*right 2, up 4*	*R′ (5, 7)*

4

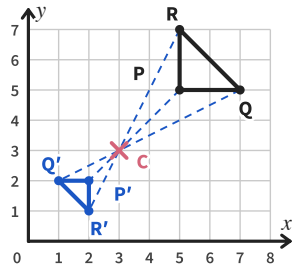
Enlarge the shape by scale factor **−2** about the centre **C (6, 5)**.



Vertex	Journey from C	Journey × −2	New vertex
P (7, 6)	*right 1, up 1*	*left 2, down 2*	*P′ (4, 3)*
Q (8, 6)	*right 2, up 1*	*left 4, down 2*	*Q′ (2, 3)*
R (7, 7)	*right 1, up 2*	*left 2, down 4*	*R′ (4, 1)*

5 *Notice the change!*

Enlarge the shape by scale factor **−½** about the centre **C (3, 3)**.



Vertex	Journey from C	Journey × −½	New vertex
P (5, 5)	right 2, up 2	*left 1, down 1*	*P′ (2, 2)*
Q (7, 5)	*right 4, up 2*	*left 2, down 1*	*Q′ (1, 2)*
R (5, 7)	*right 2, up 4*	*left 1, down 2*	*R′ (2, 1)*

6

Omar enlarges **P (5, 7)** by scale factor −2 about **C (4, 5)**. He says the new P is (6, 9). Explain his mistake. Find the new P.

He went the same way from C:

that is scale factor 2

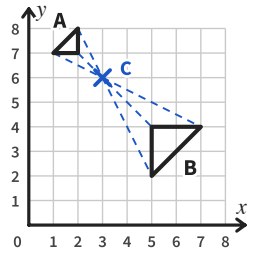
journey from C: *right 1, up 2*

reverse, × 2: *left 2, down 4*

New P *(2, 1)*

7

Describe fully the single transformation that maps shape A onto shape B.



Transformation *Enlargement*

Scale factor *−2*

Centre *(3, 6)*

8

Enlarge the point **(8, 7)** by scale factor −½ about the centre **(4, 3)**.

journey from C: *right 4, up 4*

reverse, halve: *left 2, down 2*

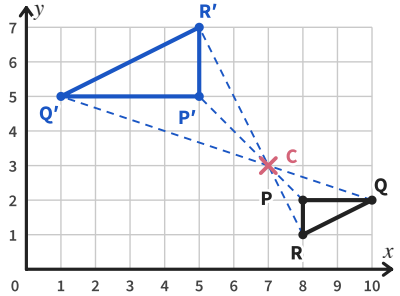
New point *(2, 1)*

Enlargement by a negative scale factor *further practice*

ANSWERS

9

Enlarge the triangle by scale factor −2 about C (7, 3).



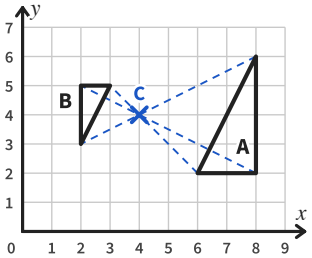
P: right 1, down 1 → left 2, up 2

Q: right 3, down 1 → left 6, up 2

Answer *P' (5, 5), Q' (1, 5), R' (5, 7)*

10

Describe fully the single transformation that maps shape A onto shape B.



scale factor −½ (upside down, half size)

centre (4, 4), where the lines cross

Answer *Enlargement*

11

In a computer game, a shield is a triangle with corners (6, 7), (8, 7) and (6, 9). The game enlarges it by scale factor −½ about (4, 5). Find the corners of the new shield.

right 2, up 2 → left 1, down 1

right 4, up 2 → left 2, down 1

Answer *(3, 4), (2, 4), (3, 3)*

12

An enlargement by scale factor −1 about (3, 2) has the same effect as a single rotation.
Describe the rotation fully.

each corner goes through (3, 2)

and the same distance out: a half turn

Answer *Rotation 180° about (3, 2)*

13

An enlargement by scale factor −2 about (6, 3) takes the point A to (2, 1). Find A.

from C to (2, 1): left 4, down 2

reverse and halve: right 2, up 1

Answer *A = (8, 4)*

14

A rectangular tile design is 8 cm by 6 cm. It is enlarged by scale factor −½. Find the perimeter of the image.

4 cm by 3 cm, upside down

4 + 3 + 4 + 3 = 14

Answer *14 cm*

15

Ben enlarges a triangle by scale factor −2. His image is twice as big, the right way up, and on the same side of the centre as the triangle.
Explain his mistake.

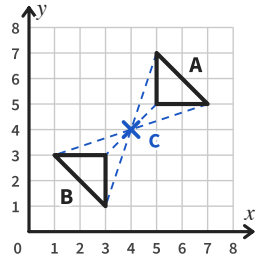
he went the same way from C

reverse: the other side, upside down

Answer *He used scale factor 2*

16

Describe fully the single transformation that maps A onto B.
Give two different answers.



Enlargement, scale factor −1,

centre (4, 4), or

Answer *Rotation 180° about (4, 4)*