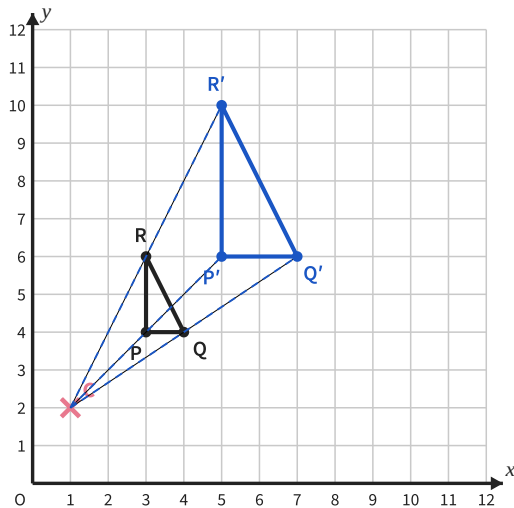
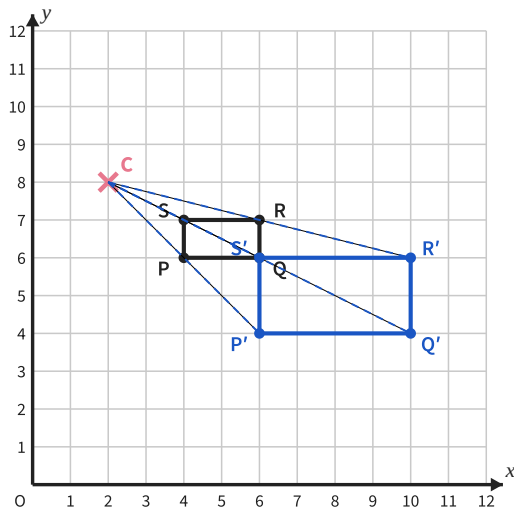


Enlargement: journeys from the centre



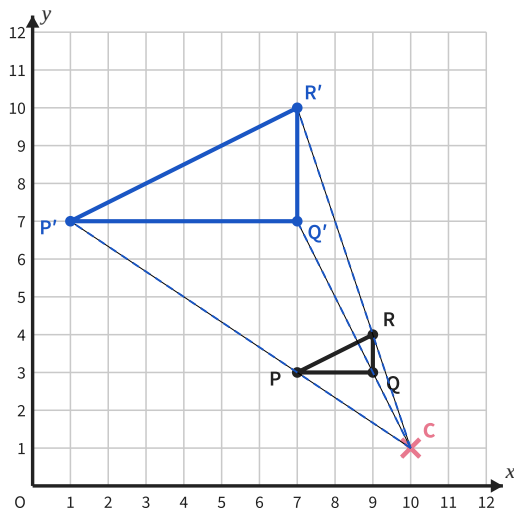
1 Enlarge the shape by scale factor 2 about the centre C (1, 2).

Vertex	Journey from C	Journey $\times 2$	Image vertex
P (3, 4)	right 2, up 2	right 4, up 4	P' (5, 6)
Q (4, 4)	right 3, up 2	<i>right 6, up 4</i>	<i>Q' (7, 6)</i>
R (3, 6)	right 2, up 4	<i>right 4, up 8</i>	<i>R' (5, 10)</i>



2 Enlarge the shape by scale factor 2 about the centre C (2, 8).

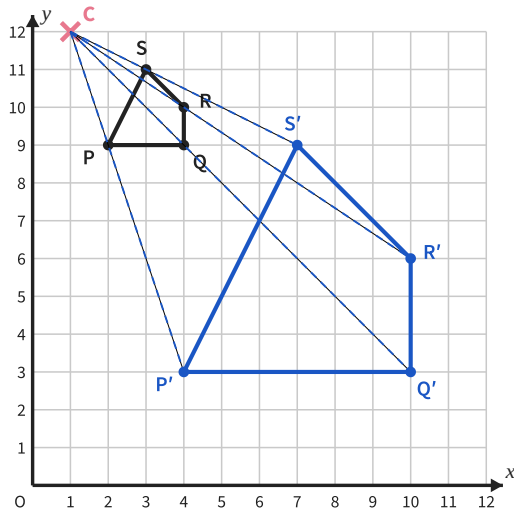
Vertex	Journey from C	Journey $\times 2$	Image vertex
P (4, 6)	right 2, down 2	<i>right 4, down 4</i>	<i>P' (6, 4)</i>
Q (6, 6)	right 4, down 2	<i>right 8, down 4</i>	<i>Q' (10, 4)</i>
R (6, 7)	right 4, down 1	<i>right 8, down 2</i>	<i>R' (10, 6)</i>
S (4, 7)	right 2, down 1	<i>right 4, down 2</i>	<i>S' (6, 6)</i>



3 Enlarge the shape by scale factor 3 about the centre C (10, 1).

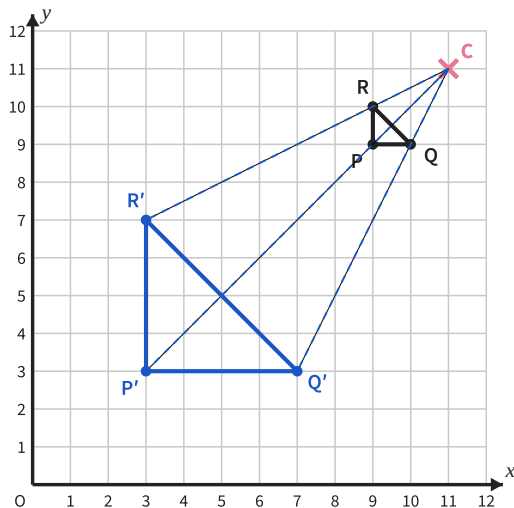
Vertex	Journey from C	Journey $\times 3$	Image vertex
P (7, 3)	left 3, up 2	<i>left 9, up 6</i>	<i>P' (1, 7)</i>
Q (9, 3)	left 1, up 2	<i>left 3, up 6</i>	<i>Q' (7, 7)</i>
R (9, 4)	left 1, up 3	<i>left 3, up 9</i>	<i>R' (7, 10)</i>

Enlargement: journeys from the centre



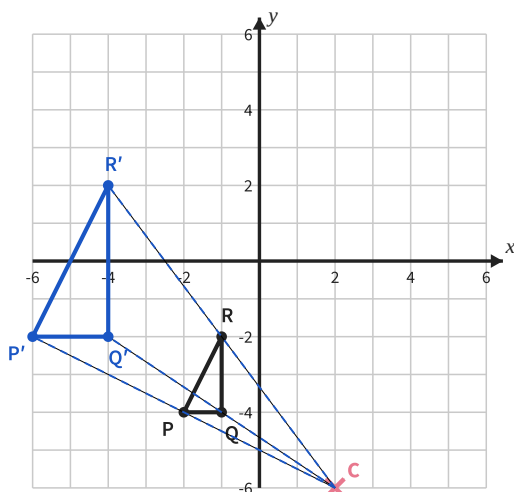
4 Enlarge the shape by scale factor 3 about the centre C (1, 12).

Vertex	Journey from C	Journey $\times 3$	Image vertex
P (2, 9)	right 1, down 3	<i>right 3, down 9</i>	<i>P' (4, 3)</i>
Q (4, 9)	right 3, down 3	<i>right 9, down 9</i>	<i>Q' (10, 3)</i>
R (4, 10)	right 3, down 2	<i>right 9, down 6</i>	<i>R' (10, 6)</i>
S (3, 11)	right 2, down 1	<i>right 6, down 3</i>	<i>S' (7, 9)</i>



5 Enlarge the shape by scale factor 4 about the centre C (11, 11).

Vertex	Journey from C	Journey $\times 4$	Image vertex
P (9, 9)	left 2, down 2	left 8, down 8	P' (3, 3)
Q (10, 9)	<i>left 1, down 2</i>	<i>left 4, down 8</i>	<i>Q' (7, 3)</i>
R (9, 10)	<i>left 2, down 1</i>	<i>left 8, down 4</i>	<i>R' (3, 7)</i>

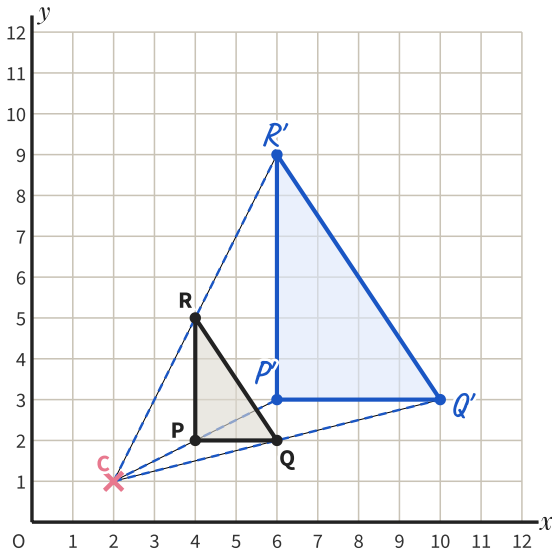


6 Enlarge the shape by scale factor 2 about the centre C (2, -6).

P left 4, up 2 $\rightarrow$ left 8, up 4 $\rightarrow$ P' (-6, -2)
Q left 3, up 2 $\rightarrow$ left 6, up 4 $\rightarrow$ Q' (-4, -2)
R left 3, up 4 $\rightarrow$ left 6, up 8 $\rightarrow$ R' (-4, 2)



5



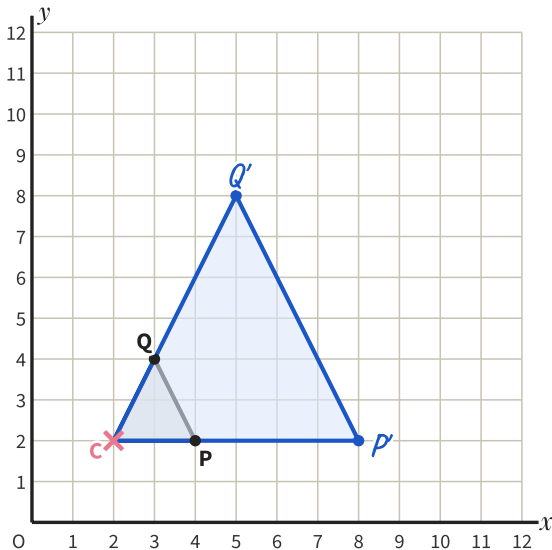
Enlarge the shape by scale factor 2 about the centre $C(2, 1)$.

P right 2, up 1 $\rightarrow$ right 4, up 2 $\rightarrow P'(6, 3)$

Q right 4, up 1 $\rightarrow$ right 8, up 2 $\rightarrow Q'(10, 3)$

R right 2, up 4 $\rightarrow$ right 4, up 8 $\rightarrow R'(6, 9)$

6



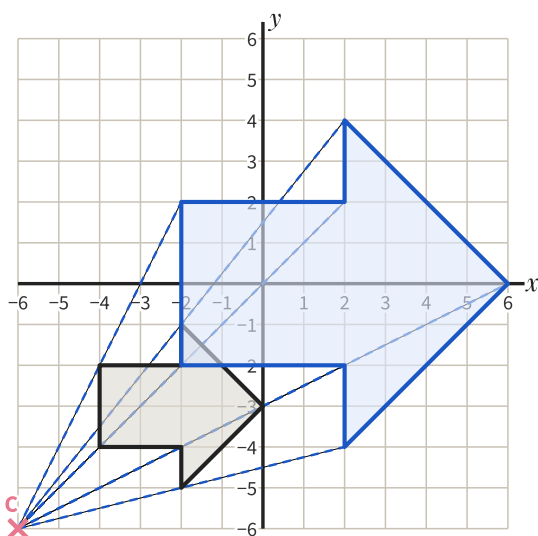
A tile designer enlarges this triangle by scale factor 3 about its corner $C(2, 2)$. Draw the enlarged tile.

C stays at $(2, 2)$

P right 2, up 0 $\rightarrow$ right 6, up 0 $\rightarrow P'(8, 2)$

Q right 1, up 2 $\rightarrow$ right 3, up 6 $\rightarrow Q'(5, 8)$

7



A sign maker enlarges this arrow by scale factor 2 about the centre $C(-6, -6)$. Draw the enlarged arrow.

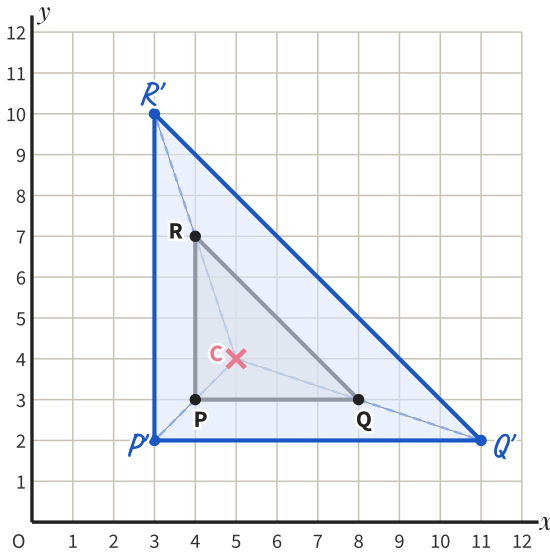
Each journey from $C \times 2$.

Corners of the image:

$(-2, -2), (2, -2), (2, -4), (6, 0), (2, 4), (2, 2), (-2, 2)$



8



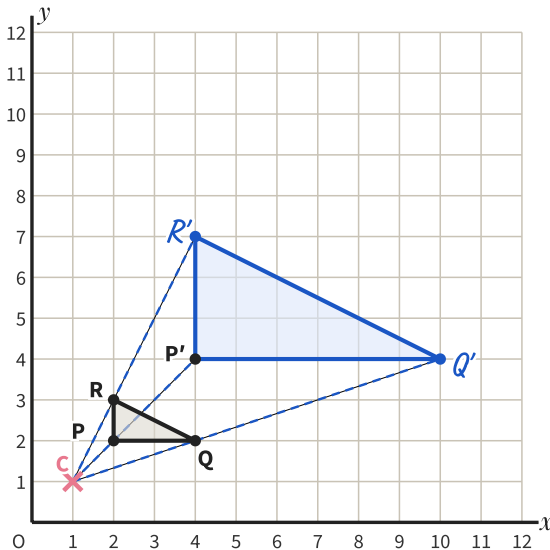
Enlarge the shape by scale factor 2 about the centre $C(5, 4)$.
 C is inside the shape.

P left 1, down 1 $\rightarrow$ left 2, down 2 $\rightarrow P'(3, 2)$

Q right 3, down 1 $\rightarrow$ right 6, down 2 $\rightarrow Q'(11, 2)$

R left 1, up 3 $\rightarrow$ left 2, up 6 $\rightarrow R'(3, 10)$

9



A projector at C enlarges the picture PQR . The corner P moves to P' .

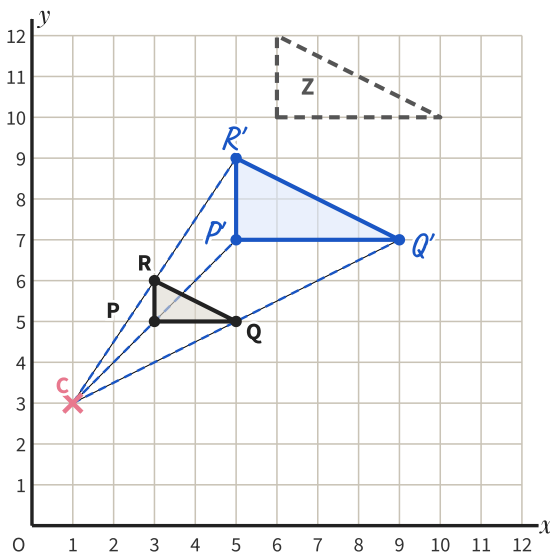
(a) What is the scale factor?

(b) Draw the rest of the enlarged picture.

(a) 3

P right 1, up 1 $\rightarrow P'$ right 3, up 3, so $\times 3$

10



Zara enlarges PQR by scale factor 2 about the centre $C(1, 3)$.
 Her answer is the dashed shape Z .

Explain Zara's mistake. Then draw the correct enlargement.

Z is the right size but in the wrong place.

She doubled the journeys from O , not from C .

Each journey must start at $C(1, 3)$.