

Enlargement and scale factors

Pearson Edexcel GCSE Mathematics 1MA1

L030 • Geometry and measures

60 minute lesson | learner resources

The goal and the evidence

Connect & Check → Share → Present → Apply → Recall & Review

Enlarge shapes from a stated centre, including positive fractional factors, and explain how centre and factor determine the image.

Explain, apply and check independently.

Starting-point diagnostic

R1–R3 • Attempt without notes

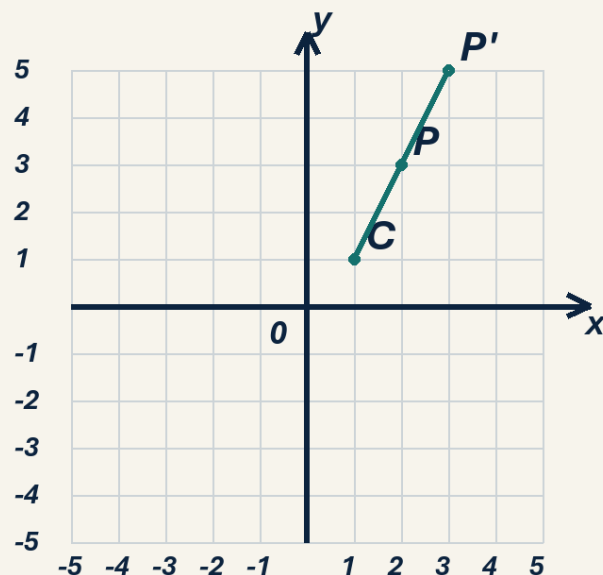
Find half of 6.

Translate (1,1) by (2,3).

A side grows from 3 cm to 9 cm. Find the multiplier.

See the geometry

Use the diagram and practical sheet.



Centre $C(1, 1)$, scale factor 2

$$CP' = 2 \times CP$$

**Scale from the centre,
not from the origin.**

Teaching sketch • not to scale

Worked example and your turn

D1 • Explain each step

Model: centre origin, $k=2$ sends $(2,1)$ to $(4,2)$.
Enlarge $(3,2)$ by $k=3$ about origin.

Try the paired problem; check independently.

Worked example and your turn

D2 • Explain each step

Model: centre origin, $k=1/2$ sends $(6,4)$ to $(3,2)$.
Enlarge $(8,6)$ by $k=1/2$.

Try the paired problem; check independently.

Worked example and your turn

D3 • Explain each step

Model: $C(1,1)$, $P(3,1)$, $k=2$ gives $P'(5,1)$. Now $C(1,1)$, $P(2,3)$, $k=2$.

Try the paired problem; check independently.

Worked example and your turn

D4 • Explain each step

Model: side $4 \rightarrow 10$ gives $k=2.5$. A matching side is $6 \rightarrow 9$. Find k and the image of a 4 cm side.

Try the paired problem; check independently.

A method you can explain

Name the fact or construction at each step.

Check against the original question.

Diagnostic pause

Choose and explain before moving on.

Centre (1,1), point (3,1), factor 2. Image A (6,2), B (5,1), C (4,1).

Use your explanation to decide the next step.

Careful variation

A1 • Show your reasoning

Centre origin: enlarge (4,2) with $k=2$, $k=1$, $k=1/2$.
Compare positions.

Explain your decisions and check the result.

Independent application

A2 • Show your reasoning

Triangle $(1,1),(3,1),(1,2)$, centre origin, $k=2$. Give image vertices and a side-length check.

Explain your decisions and check the result.

Use the method in context

A3 • Show your reasoning

Centre $C(1,1)$, triangle $P(2,1), Q(4,1), R(2,3)$, $k=1/2$.
Find all image vertices.

Explain your decisions and check the result.

Intentional practice feedback

Read after attempting A3

$P'(1.5, 1)$, $Q'(2.5, 1)$, $R'(1.5, 2)$.

Correct one step and explain the change.

A claim to test

C1 • Show your reasoning

A factor $\frac{1}{2}$ makes every angle half as large. Explain the error.

Explain your decisions and check the result.

Deepen the reasoning

C2 • Show your reasoning

A shape is enlarged by factor $\frac{3}{4}$. Its image has a side of length 9 cm. Find the original side and explain why it must be longer.

Explain your decisions and check the result.

Retrieval without notes

Q1–Q3 • Numeric answers

x of (3,2), origin, factor 2

y of (8,6), origin, factor $\frac{1}{2}$

Factor for side 4→10

Retrieval without notes

Q4–Q6 • Numeric answers

Image length of 12 at factor $\frac{1}{4}$

x of $P(3,1)$, centre $(1,1)$, factor 2

Original length if image is 3 and factor $\frac{1}{2}$

Independent exit evidence

P1 • Without notes • Teacher review

Enlarge $P(2,3)$ by factor 2 about $C(1,1)$, showing displacement. [2]

Show working and check your answer.

Independent exit evidence

P2 • Without notes • Teacher review

A 10 cm side becomes 4 cm. Find the scale factor and the image of a 15 cm side. [2]

Show working and check your answer.

Feedback and next steps

P3 • Completion is not mastery

Explain one error you have corrected.

Set a fresh question and a delayed check.

Before the next lesson

L031: Bearings and scale drawings

Complete F1 tomorrow without notes.

Attempt F2 and bring one question.

Negative enlargement

Higher alternative • Model • 3 min

$C(1, 1)$, $P(3, 2)$, factor -2

$(2, 1) \rightarrow (-4, -2)$; $P' = (-3, -1)$

Reverse direction from the centre

Higher alternative • H1–H2 • 3 min

Negative factor: opposite side of centre.

Length ratio uses the positive magnitude.

Independent Higher evidence

HX1 • 2 marks • 2 min

$C(1, 1)$, $P(3, 4)$, scale factor -2

Show the displacement and image.

Independent Higher evidence

HX2 • 2 marks • 2 min

Does factor -1 make lengths negative?

Explain and describe the image position.

Optional stretch

Enlarge a rectangle 3 cm by 5 cm by factor 2.5. Find new area.

Show a method. Explain a check or counterexample.

Optional deep challenge

An enlargement factor is -2 about the origin. Where does $(3, -4)$ map, and what happens to orientation?

Show a method. Explain a check or counterexample.

L030 Recall & Review

Enlargement and scale factors



Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

Objective: Enlarge shapes from a stated centre, including positive fractional factors, and explain how centre and factor determine the image.

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.

What Went Well (WWW)

I selected the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Identify the mathematical method, representation, reasoning or check that improved.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Set one precise next-step action and test it on a fresh question.

Extension route

Choose this route only after the core evidence is secure.

Stretch

Enlarge a rectangle 3 cm by 5 cm by factor 2.5. Find new area.

Deep challenge

An enlargement factor is -2 about the origin. Where does $(3, -4)$ map, and what happens to orientation?

Explain your reasoning clearly enough that another learner could check it.