

Coordinates and transformations

Pearson Edexcel GCSE Mathematics 1MA1

L029 • Geometry and measures

60 minute lesson | learner resources

The goal and the evidence

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

Transform points and shapes by translation, reflection and rotation, and describe each transformation completely.

Explain, apply and check independently.

Starting-point diagnostic

R1–R3 • Attempt without notes

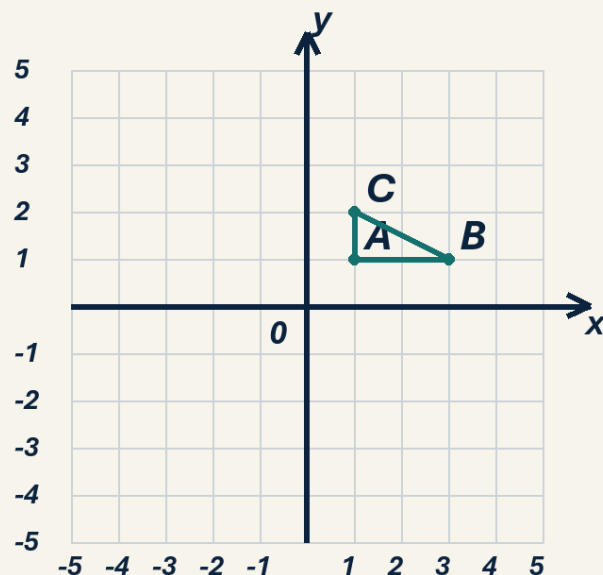
Plot $(-2,3)$: which direction is x from the origin?

Find $-2+5$.

How many degrees is a quarter turn?

See the geometry

Use the diagram and practical sheet.



Teaching sketch • not to scale

Reflect triangle ABC

in the x -axis ($y = 0$).

Record image coordinates.

Worked example and your turn

D1 • Explain each step

Model: $(1,2)+(3,-1)=(4,1)$. Translate $(-2,4)$ by $(5,-3)$.

Try the paired problem; check independently.

Worked example and your turn

D2 • Explain each step

Model: reflect $(2,3)$ in $x=0$ to $(-2,3)$. Reflect $(-4,1)$ in $x=0$.

Try the paired problem; check independently.

Worked example and your turn

D3 • Explain each step

Model: reflect $(4,2)$ in $x=1$ to $(-2,2)$. Reflect $(3,-1)$ in $x=1$.

Try the paired problem; check independently.

Worked example and your turn

D4 • Explain each step

Model: 90° anticlockwise about origin sends $(2,1)$ to $(-1,2)$. Rotate $(3,-2)$ the same way.

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.

Reflect $(3,2)$ in the y -axis. A $(3,-2)$, B $(-3,2)$, C $(2,3)$.

Use your explanation to decide the next step.

Careful variation

A1 • Show your reasoning

Translate $(2, -1)$ by $(3, 0)$, $(0, 3)$, then $(3, 3)$, each from the original point.

Explain your decisions and check the result.

Independent application

A2 • Show your reasoning

Triangle $A(1,1)$, $B(3,1)$, $C(1,2)$: reflect in $y=0$. Give image vertices and check one side.

Explain your decisions and check the result.

Use the method in context

A3 • Show your reasoning

Triangle $A(1,1)$, $B(3,1)$, $C(1,2)$ moves to $(-1,4)$, $(1,4)$, $(-1,5)$. Describe the transformation.

Explain your decisions and check the result.

Intentional practice feedback

Read after attempting A3

Translation vector $(-2, 3)$.

Correct one step and explain the change.

A claim to test

C1 • Show your reasoning

A point lies on the mirror line. Does it move under reflection? Explain.

Explain your decisions and check the result.

Deepen the reasoning

C2 • Show your reasoning

Compare rotating $(2,3)$ by 90° clockwise and 90° anticlockwise about the origin. Explain why the direction must be stated.

Explain your decisions and check the result.

Retrieval without notes

Q1–Q3 • Numeric answers

x of $(-2,4)+(5,-3)$

y of $(-2,4)+(5,-3)$

x of reflection of $(4,2)$ in $x=1$

Retrieval without notes

Q4–Q6 • Numeric answers

y after $(3, -2)$ turns 90° anticlockwise at origin

Clockwise half-turn in degrees

Supplement of 112° , degrees

Independent exit evidence

P1 • Without notes • Teacher review

Reflect $(5, -2)$ in $x=2$. Give image and explain the distance check. [2]

Show working and check your answer.

Independent exit evidence

P2 • Without notes • Teacher review

Rotate $(2,4)$ through 90° clockwise about origin.
State the image and rule. [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

L030: Enlargement and scale factors

Complete F1 tomorrow without notes.

Attempt F2 and bring one question.

Combining transformations

Higher alternative • Model • 3 min

$$(2, 3) \rightarrow (-2, 3) \rightarrow (-2, -3)$$

Two axis reflections → half-turn about O.

Does the order matter?

Higher alternative • H1–H2 • 3 min

Translate, then reflect. Reverse the order.

Track the intermediate point each time.

Independent Higher evidence

HX1 • 2 marks • 2 min

Reflect $(3, 5)$ in $x = 0$, then $y = 0$.

State the image and a single transformation.

Independent Higher evidence

HX2 • 2 marks • 2 min

Translation $(2, 0)$ and reflection in $x = 0$

Use $(1, 1)$ to test whether order matters.

Optional stretch

Translate $(-3, 4)$ by $(5, -7)$ and reflect the result in the x-axis.

Show a method. Explain a check or counterexample.

Optional deep challenge

Do reflection and translation always commute? Use a point and transformations as a counterexample.

Show a method. Explain a check or counterexample.

L029 Recall & Review

Coordinates and transformations



Fresh evidence: prove the objective

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

Objective: Transform points and shapes by translation, reflection and rotation, and describe each transformation completely.

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

Translate $(-3, 4)$ by $(5, -7)$ and reflect the result in the x-axis.

Deep challenge

Do reflection and translation always commute? Use a point and transformations as a counterexample.

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