

Slide by slide delivery map

Pearson Edexcel GCSE Mathematics 1MA1 • L029

26 slides • 60 minutes • Teacher use only • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

01 Coordinates and transformations 1 min Recall

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

02 The goal and the evidence 1 min Recall

Four-quadrant coordinates; L025 right angles; L028 perpendicular distances.

03 Starting-point diagnostic 5 min Recall

If coordinates swap accidentally, read x then y . If reflection across $x=1$ is treated as $x=0$, count perpendicular distances. For rotation, use tracing paper and label the centre before turning.

04 See the geometry 2 min Discover

Translation adds the same vector to every vertex. Reflection places each image the same perpendicular distance on the other side of the mirror. Rotation preserves distances from its centre and turns all points through the same directed angle. These three transformations preserve lengths and angles.

05 Worked example and your turn 3 min Discover

(3,1). Add each component.

Delivery continued

06 Worked example and your turn 3 min Discover

(4,1). Same y, x changes sign.

07 Worked example and your turn 3 min Discover

(-1,-1). Each x is two units from 1.

08 Worked example and your turn 3 min Discover

(2,3). Rule $(x,y) \rightarrow (-y,x)$ for this centre and direction.

09 A method you can explain 2 min Discover

Plot vertices accurately; transform each one; join in the same order. Describe translation by a vector, reflection by a line equation, rotation by angle, direction and centre. Check lengths and orientation.

10 Diagnostic pause 3 min Apply

Reflect (3,2) in the y-axis. A (3,-2), B (-3,2), C (2,3). Answer B: horizontal distance changes side.

Delivery continued

11 Careful variation 4 min Apply

$(5, -1)$; $(2, 2)$; $(5, 2)$. Each vector acts on the original.

12 Independent application 4 min Apply

$A'(1, -1)$, $B'(3, -1)$, $C'(1, -2)$; $AB = A'B' = 2$. Reflection reverses vertical sign.

13 Use the method in context 4 min Apply

Translation vector $(-2, 3)$. All three displacements agree.

14 Intentional practice feedback 2 min Apply

All three displacements agree. No calculator needed. Check each coordinate separately; use squared distance from the centre if verifying a rotation numerically, but do not rely on a single vertex to describe a whole shape.

15 A claim to test 4 min Challenge

No; its perpendicular distance is zero. It is a fixed point.

Delivery continued

16 Deepen the reasoning 4 min Challenge

Clockwise $(3, -2)$; anticlockwise $(-3, 2)$. They are different images. A complete rotation description needs centre, angle and direction.

17 Retrieval without notes 2 min Prove

Answers: 3, 1, -2. Completion is not mastery.

18 Retrieval without notes 2 min Prove

Answers: 3, 180, 68. Completion is not mastery.

19 Independent exit evidence 2 min Prove

$(-1, -2)$ B1; both three units from $x=2$ B1. y unchanged.

20 Independent exit evidence 3 min Prove

$(4, -2)$ B1; $(x, y) \rightarrow (y, -x)$ B1. Direction matters.

Delivery continued

21 Feedback and next steps 2 min Prove

If coordinates swap accidentally, read x then y . If reflection across $x=1$ is treated as $x=0$, count perpendicular distances. For rotation, use tracing paper and label the centre before turning.

22 Before the next lesson 1 min Recall

An enlargement multiplies every displacement from a fixed centre by a scale factor. It changes lengths by that factor while preserving shape. The centre need not be the origin.

23 Combining transformations alternative Higher alternative

Higher route: replace the 2-minute A3 feedback and the two 4-minute Challenge discussions with this 10-minute taught extension. Retain core P1–P2. Set HX1–HX2 as the final four minutes of that alternative, and use the shared challenges later if needed. The core route remains 60 minutes; the extension is not an additional compulsory ten minutes. Route choice reflects tier curriculum, not temporary support needs. Reflect $P(2,3)$ in $x=0$: $(-2,3)$. Then reflect in $y=0$: $(-2,-3)$. For any point (x,y) , the result is $(-x,-y)$, equivalent to a 180° rotation about the origin. Reversing these two perpendicular-axis reflections gives the same result. This does not mean every pair of transformations can be reversed without changing the image.

24 Does the order matter? alternative Higher alternative

Higher route: replace the 2-minute A3 feedback and the two 4-minute Challenge discussions with this 10-minute taught extension. Retain core P1–P2. Set HX1–HX2 as the final four minutes of that alternative, and use the shared challenges later if needed. The core route remains 60 minutes; the extension is not an additional compulsory ten minutes. Route choice reflects tier curriculum, not temporary support needs. A single example can disprove a claim of invariance, but does not establish a general rule. Track coordinates in order. A translation followed by a reflection can differ from the reverse order.

25 Independent Higher evidence alternative Higher alternative

Higher route: replace the 2-minute A3 feedback and the two 4-minute Challenge discussions with this 10-minute taught extension. Retain core P1–P2. Set HX1–HX2 as the final four minutes of that alternative, and use the shared challenges later if needed. The core route remains 60 minutes; the extension is not an additional compulsory ten minutes. Route choice reflects tier curriculum, not temporary support needs. $(-3,-5)$ B1; rotation 180° about origin B1 (angle and centre).

Delivery continued

26 Independent Higher evidence alternative Higher alternative

Higher route: replace the 2-minute A3 feedback and the two 4-minute Challenge discussions with this 10-minute taught extension. Retain core P1–P2. Set HX1–HX2 as the final four minutes of that alternative, and use the shared challenges later if needed. The core route remains 60 minutes; the extension is not an additional compulsory ten minutes. Route choice reflects tier curriculum, not temporary support needs. No B1; translation first gives $(-3,1)$, reflection first gives $(1,1)$, both required B1.

Recall & Review: feedback and extension integration

Lesson L029: Coordinates and transformations

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

Timing for a 60-minute lesson

0-7 Connect & Check; 7-14 Share; 14-25 Present/model; 25-44 Apply route choice/practice; 44-52 independent exam-style check; 52-60 Recall & Review, WWW/EBI and next step.

Recall & Review evidence

At the end of the lesson, solve a fresh question without prompts, explain one check, correct one error and record the next practice step.

What Went Well (WWW)

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

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.

Integrated stretch and deep challenge

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.

Teacher use

Use the What Went Well (WWW) and Even Better If (EBI) prompts to write mathematics-specific feedback linked to the objective. Do not accept generic praise: identify the method, representation, reasoning or checking step that improved, then set a fresh next-step question.

Assessment evidence to inspect: Check the formative mini-test and independent workbook response against the objective. Use the teacher answers or mark guidance; group errors for reteaching. No calculator needed. Check each coordinate separately; use squared distance from the centre if verifying a rotation numerically, but do not rely on a single vertex to describe a whole shape..