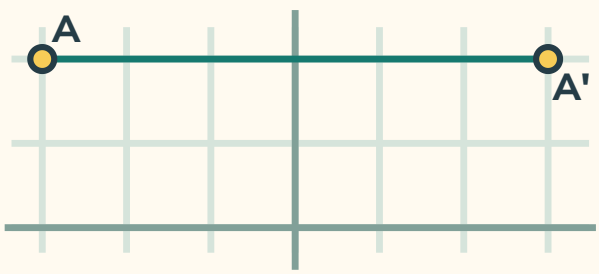
MATHS FIELD GUIDE · GRADE 5

Reflection uses a mirror line

OPENING PROBLEM

Reflect A(−3,2) in the y-axis.



A (-3, 2)
A' (3, 2)

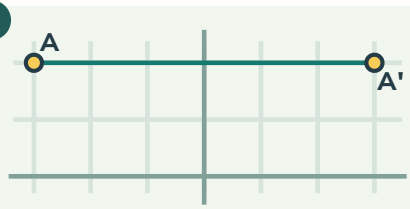
02 Locate a mirror by equal distances
03 Rules and worked cases
04 Fold the grid map
05 Compare the models
06 Track one point and one length
07 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Locate a mirror by equal distances

A point on the mirror stays fixed. For any other point, the mirror crosses the segment to its image halfway, at a right angle.

1

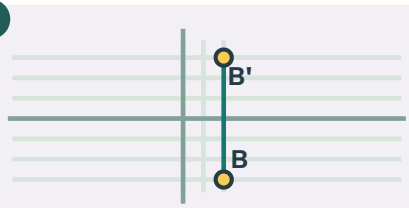


A (-3, 2)
A' (3, 2)

Reflect A(–3,2) in the y-axis.

The height stays two. Three units left becomes three units right, so A' = (3,2).

2

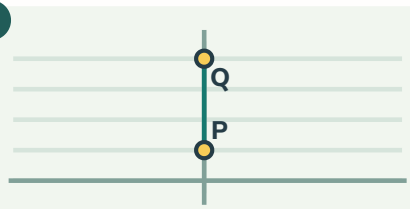


B (2, -3)
B' (2, 3)

Reflect B(2,–3) in the x-axis.

The horizontal position stays two. The sign of the vertical coordinate changes.

3

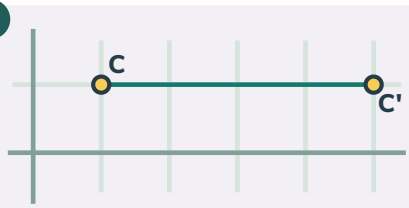


P (0, 1)
Q (0, 4)

What happens to P and Q in the y-axis mirror?

Both are on the mirror line. Each maps to itself.

4



C (1, 1)
C' (5, 1)

Find the vertical mirror taking (1,1) to (5,1).

Halfway from x = 1 to x = 5 is x = 3. Each point is two units from that line.

Mirror in y-axis
(x,y) goes to (–x,y).

Mirror in x-axis
(x,y) goes to (x,–y).

CHAPTER PROBLEM

What happens to a point on a mirror line?

It stays in the same position.

MATHS REFERENCE · GRADE 5

Reflection uses a mirror line

A reflection places each point on the other side of a mirror line.

A point and its image are equally far from that line, measured at right angles to it.

Cases to recognise

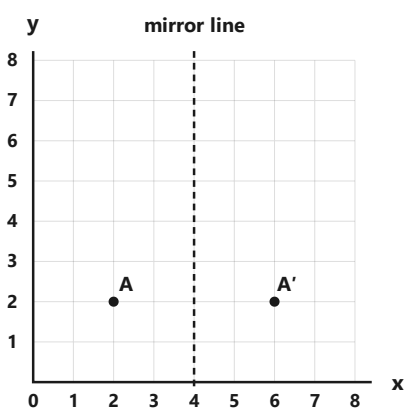
Situation	What to do and why
Reflect (3,1) in x = 5	Three is two left of five. The mirror x-coordinate is seven, giving (7,1).
Reflect (2,6) in y = 4	Move two below y = 4 to (2,2).

Read the model

Reflect one point

The mirror line is x = 4. A at (2, 2) is two units to its left.

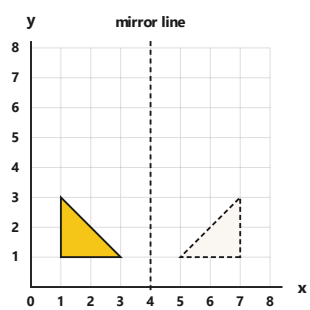
A' at (6, 2) is two units to its right. Both have the same height.



Reflect every vertex

Reflect (1, 1), (3, 1), (1, 3) across x = 4.

The image vertices are (7, 1), (5, 1), (7, 3). Each pair has equal perpendicular distance from the mirror.



reflection A mirror transformation.
mirror line The fixed line used for a reflection.
perpendicular Meeting at a right angle.
orientation The way a shape's parts face or are ordered.



A (1, 1)
A' (4, 3)

Find the slide from (1,1) to (4,3).

Three right and two up. Distance alone would not give the direction.

WORKED INVESTIGATION

Fold the grid map

Fold a grid along the vertical line x = 4. A point at (2, 3) lies two squares to the left, so its mirror lies two squares to the right at (6, 3).

Look at this part	What it tells you
Point (1, 2)	(7, 2)
Point (4, 2)	(4, 2)
Point (5, 1)	(3, 1)

Work it through

Connect a point and its mirror. The fold crosses their joining segment at its midpoint and at a right angle.

Catch the mistake

Counting distance from the edge of the paper can give an incorrect mirror position. Measure from the fold line each time.

Compare the cases

A point on the mirror stays put

A point at (4, 3) already lies on x = 4.

Its distance from the mirror is zero, so it maps to itself.

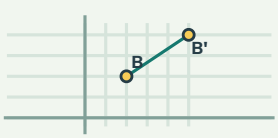
What stays and what changes

A reflection preserves side lengths and angles.

The shape keeps its size but its orientation reverses, like left and right in a mirror.

Change one condition

Reflect a reflected point again in the same fold. Equal distances on opposite sides return the point to where it started.



B (2, 2)
B' (5, 4)

If B undergoes that same slide, where does it land?

At (5,4). Add three to the first coordinate and two to the second.

REFLECTION USES A MIRROR LINE

Compare the models

A slide is not a reflection

Putting a copy somewhere on the opposite side is not enough.

The distances from the mirror must match, and corresponding points must line up across it.

The line matters

The same original shape has different images for different mirror lines.

Name or draw the mirror before reflecting.

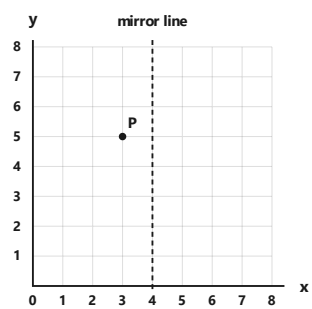
Check by folding

On paper, fold along the mirror line.

Every original point should meet its corresponding image point. This is a useful check of both distance and alignment.

Explain your reasoning

P is reflected across the shown mirror line. Give P'.



P' is (5, 5). P is one unit left of x = 4, so P' is one unit right at the same height.

Two more worked cases

Situation	Reasoning
A point lies on the mirror line	Its distance from the mirror is zero, so it stays fixed.
Points (1,4) and (7,4) are mirrors	Their joining segment is horizontal. The mirror is its perpendicular bisector x = 4.

(6, 4) → (2, 3)
↓
4 left, 1 down

How do you reverse this translation?

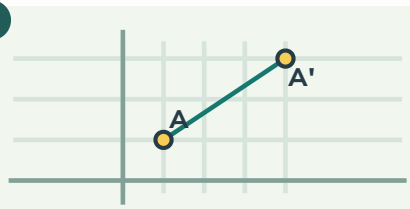
Move four right and one up. You return to (6,4).

ILLUSTRATED PROBLEM SHEET

Track one point and one length

Translations, reflections and rotations preserve distances. Each moves points by a different rule.

1

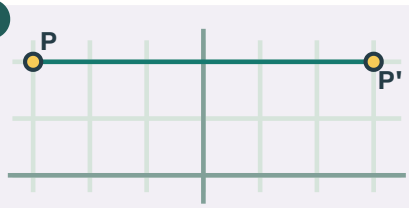


A (1, 1)
A' (4, 3)

What translation takes A to A'?

Three units right and two up. Apply that same displacement to every point.

2

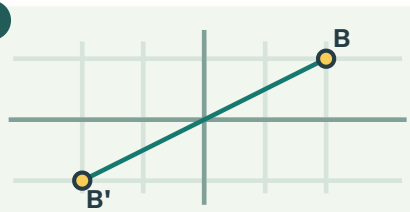


P (-3, 2)
P' (3, 2)

Where is the mirror line?

The y-axis. It bisects the horizontal segment between the two points at right angles.

3

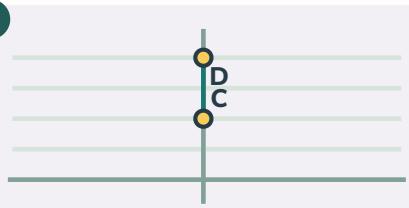


B (2, 1)
B' (-2, -1)

Which turn about the origin works?

A half-turn. Both coordinates change sign.

4



C (0, 2)
D (0, 4)

Reflect this segment in the y-axis. Where does it go?

Every point is already on the mirror. The segment stays in place.

Translate (3,2) by (−1,4)
(2,6).

Reflect (3,2) in the x-axis
(3,−2).

CHAPTER PROBLEM

An image point is three units from the mirror but its original is two units away. Is the reflection correct?

No. The perpendicular distances must be equal.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 Does a mirror image preserve the distances between a shape's vertices?	Yes. Its size and angles stay the same even though orientation reverses.
02 Can a translation turn a right-pointing arrow upside down?	No. Every point moves through the same displacement, so the direction stays fixed.
03 Two points (2, 5) and (8, 5) are mirror images in a vertical fold. Where is the fold?	It lies halfway between x = 2 and x = 8, at x = 5. Both points are three squares from that line.
04 Reflect (6,3) in the line x = 2.	Six lies four to the right. Move four to the left of two, giving (−2,3).
05 A point and its mirror coincide. What can you deduce?	Its distance from the mirror is zero, so it is on the mirror line.

Point	Move right	Move up
A	3	1
B	3	2

Could both rows come from a single translation?

No. A moved three right and one up. B moved three right and two up.

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