REFLECTIONS IN DIAGONAL LINES

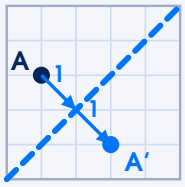
BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

1. **Count diagonally, corner to corner across the squares, to the mirror line.**
2. Count the same number of squares on the other side.

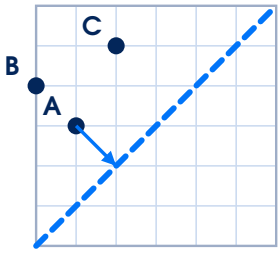
Tip: turn your sheet so the mirror line goes straight up and down.



1 Is each dashed line vertical (V), horizontal (H) or diagonal (D)? Write V, H or D.

a  b  c  d 

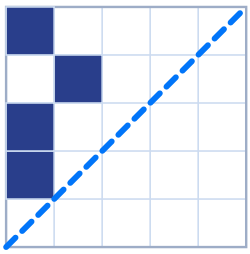
2 Reflect each point in the diagonal mirror line. Mark the new point.



Point A has been started for you.

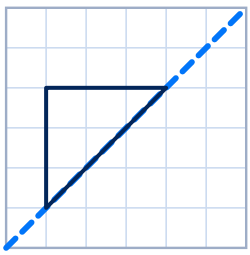
Count the diagonal steps to the line.

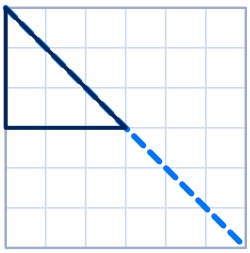
3 Shade squares so that the diagonal line is a line of symmetry.



Each shaded square has a matching square on the other side of the line.

4 Reflect each shape in the diagonal mirror line. The shapes touch the line.

a) 

b) 

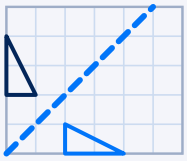
REFLECTIONS IN DIAGONAL LINES

SUPPORT

NAME _____ CLASS _____ DATE _____

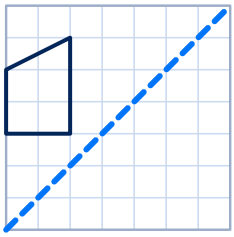
KEY IDEA

Measure the distance to a diagonal mirror line diagonally, at right angles to the line. Turning the sheet so the line is vertical can help. A point on the line does not move.

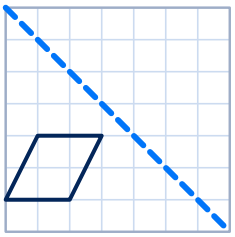


1 Reflect each shape in the diagonal mirror line.

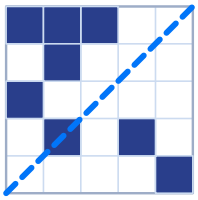
a)



b)

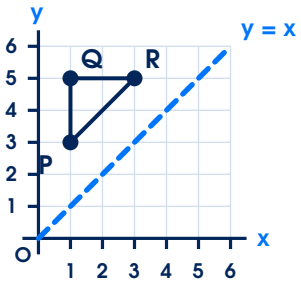


2 Shade 3 more squares so that the diagonal line is a line of symmetry.



Tip: square (column, row) matches square (row, column) across the line.

3 The dashed line is the line y = x.



a) Reflect the triangle in the line y = x.
Write the coordinates of each image point.

P (1, 3) → ☐

Q (1, 5) → ☐

R (3, 5) → ☐

b) What do you notice about the coordinates?

4 Is the blue shape a correct reflection in the dashed line? Write YES or NO.

a



☐

b



☐

c



☐

REFLECTIONS IN DIAGONAL LINES

CORE

NAME _____ CLASS _____ DATE _____

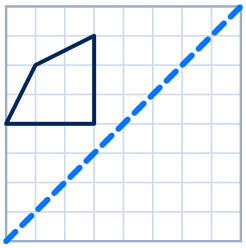
KEY IDEA

Measure to a diagonal mirror at right angles, diagonally across squares. Reflecting in y = x: (a, b) → (b, a). Reflecting in y = –x: (a, b) → (–b, –a).

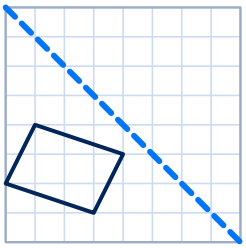
FLUENCY

1 Reflect each shape in the diagonal mirror line.

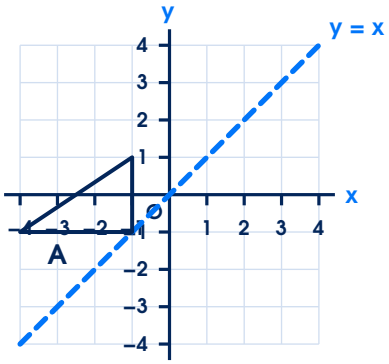
a)



b)



2 Use the coordinate grid.



a) Reflect shape A in the line y = x. Label the image B.

b) The vertex (–4, –1) moves to ☐

c) The vertex (–1, 1) moves to ☐

REASONING

3 a) Reflect each point in the line y = –x. Write the coordinates of its image.

POINT	(2, 5)	(–3, 1)	(4, –4)
image in y = –x	☐	☐	☐

b) Which point is invariant? Why? ☐ .....

4 Ali reflects (4, 1) in the line y = x. He counts across to the line and gets (–2, 1). Explain Ali's mistake and give the correct image.

.....

.....

REFLECTIONS IN DIAGONAL LINES

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, sketch an example of when it is true and when it is not.

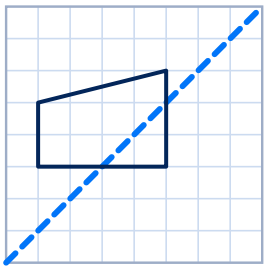
a) Reflecting in y = x swaps the coordinates. ALWAYS SOMETIMES NEVER

b) Reflecting (a, b) in y = –x gives (–a, –b). ALWAYS SOMETIMES NEVER

c) Reflecting in y = x keeps a shape in its quadrant. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 This shape crosses the diagonal mirror line. Reflect the whole shape in the line.



Tip: reflect each vertex, then check where the two shapes overlap.

3 A triangle has vertices (1, 1), (5, 1) and (3, 3). It is reflected in the line y = x.

a) Write the coordinates of the image of each vertex.

b) Which vertices are invariant points?

c) Explain how you could tell without drawing.

★ CHALLENGE FOR ALL

4 A point is reflected in the line y = x, then the image is reflected in the line y = –x.

a) P(2, 5) ends up at **b)** Q(–3, 1) ends up at

c) Describe a single transformation that has the same effect.

d) Which point ends up exactly where it started?

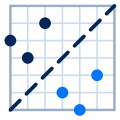
REFLECTIONS IN DIAGONAL LINES · ANSWERS

ANSWERS

BUILDING BLOCKS

1 a) D · b) V · c) H · d) D
2–4 see the diagrams (navy = given, blue = answer)

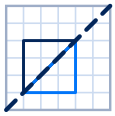
2



3



4a



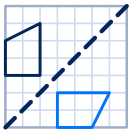
4b



SUPPORT

3 a) P′(3, 1), Q′(5, 1), R′(5, 3) · b) the x- and y-coordinates swap over
4 a) NO (it has been flipped in a vertical line) · b) YES · c) NO (it is one square too far right)

1a



1b



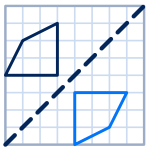
2



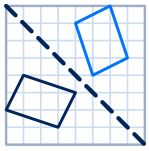
CORE

2 B: (−1, −4), (−1, −1), (1, −1) · b) (−1, −4) · c) (1, −1)
3 a) (2, 5) → (−5, −2) · (−3, 1) → (−1, 3) · (4, −4) → (4, −4) · b) (4, −4), because it lies on the line y = −x
4 Ali measured horizontally. Distances to a diagonal mirror must be measured at right angles to the line (diagonally across squares). Reflecting in y = x swaps the coordinates, so the image is (1, 4).

1a



1b



GREATER DEPTH

1 a) always · b) sometimes (only when a = b, e.g. (2, 2) → (−2, −2); (1, 3) → (−3, −1)) · c) sometimes (1st and 3rd quadrants: yes; a shape in the 2nd quadrant moves to the 4th)
3 a) (1, 1), (1, 5), (3, 3) · b) (1, 1) and (3, 3) · c) they lie on the line y = x (equal coordinates)
4 a) P → (5, 2) → (−2, −5) · b) Q → (1, −3) → (3, −1) · c) rotation of 180° about the origin, (x, y) → (−x, −y) · d) only the origin (0, 0)

2

