DESCRIBING REFLECTIONS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

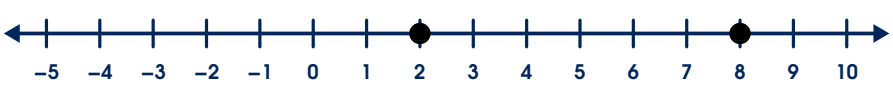
The mirror line is exactly halfway between a point and its reflection.

Count the squares between them, halve it, and count that many from either point.



6 squares apart → 3 each side

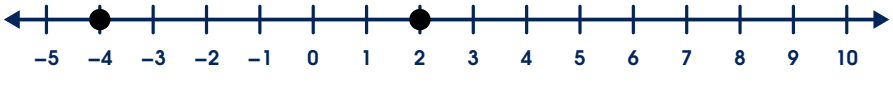
1 Each pair of dots is a point and its reflection. What number is halfway between them?

a) 

halfway: ☐

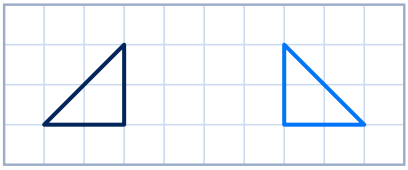
b) 

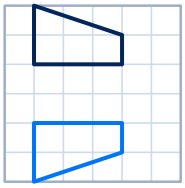
halfway: ☐

c) 

halfway: ☐

2 The blue shape is a reflection of the navy shape. Draw the mirror line.

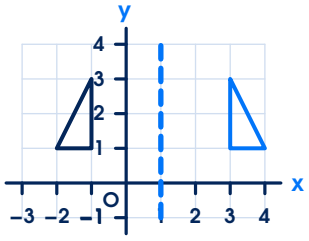
a) 

b) 

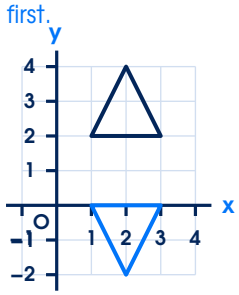
Tip: count the gap between matching corners and halve it.

3 The blue shape is a reflection of the navy shape. Complete each sentence.

In a) the mirror line is drawn for you. In b) draw the mirror line first.

a) 

reflected in the line **x =** ☐

b) 

reflected in the line **y =** ☐

4 Find the mirror line without a grid.

a) (2, 5) reflects to (6, 5). The mirror line is **x =** ☐

b) (3, 1) reflects to (3, 7). The mirror line is **y =** ☐

Look at the coordinate that changes. Find the number halfway.

DESCRIBING REFLECTIONS

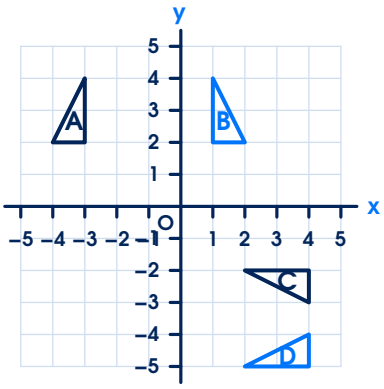
SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

To describe a reflection fully, say that it is a reflection and give the equation of the mirror line, e.g. "Reflection in the line x = 2". The mirror line is halfway between each point and its image.

1 Use the coordinate grid. Shape B is a reflection of A, and D is a reflection of C.



a) Draw the mirror line between A and B.

Its equation is ____

b) Draw the mirror line between C and D.

Its equation is ____

2 Each pair is a point and its image after a reflection. Write the equation of the mirror line.

a) (1, 3) and (7, 3) mirror line: ____

b) (–2, 5) and (–2, –1) mirror line: ____

c) (–5, 0) and (1, 0) mirror line: ____

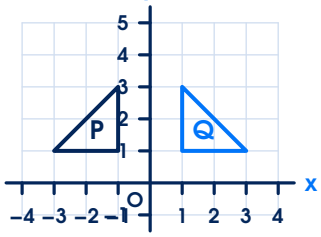
3 Which of these is a full description of a reflection?

The shape has flipped over. **It is a reflection.** **Reflection in the line y = 1.**

Circle it. Why are the other two not full descriptions?

.....

4 Describe fully the single transformation that maps shape P onto shape Q.



Shape P has been .....

in the line .....

Tip: the y-axis is the line x = 0.

DESCRIBING REFLECTIONS

CORE

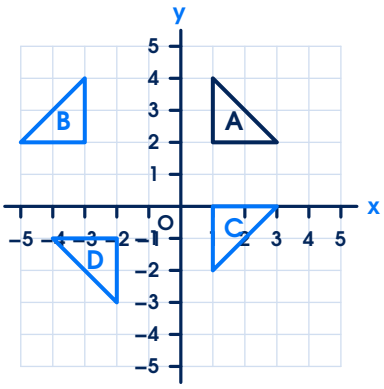
NAME _____ CLASS _____ DATE _____

KEY IDEA

Describe a reflection fully: the word reflection and the equation of the mirror line. The mirror line is halfway between each vertex and its image, and the shapes are congruent.

FLUENCY

1 Shapes B, C and D are each a reflection of shape A.



Describe fully the single transformation that maps A onto

a) B .....

b) C .....

c) D .....

2 Each point has been reflected. Write the equation of the mirror line.

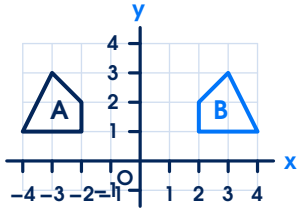
a) (–3, 4) → (5, 4) mirror line: ____

b) (2, –6) → (2, 0) mirror line: ____

c) (4, 1) → (1, 4) mirror line: ____

REASONING

3 Ella says, "Shape A has been reflected in the line y = 0 to give shape B." Explain why Ella is wrong and describe the transformation correctly.

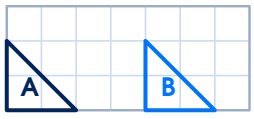


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.....

4 Kai says, "B is a reflection of A." Explain why Kai is wrong.



.....

.....

DESCRIBING REFLECTIONS

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.

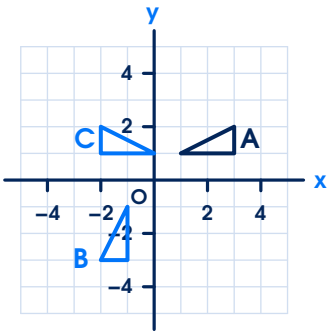
a) The mirror line bisects the line from P to its image. ALWAYS SOMETIMES NEVER

b) A point and its image have the same x-coordinate. ALWAYS SOMETIMES NEVER

c) A horizontal mirror line has an equation x = a. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 Shapes B and C are reflections of shape A.



Describe fully the reflection that maps

a) A onto B

b) A onto C

Hint: mirror lines do not have to lie on grid lines.

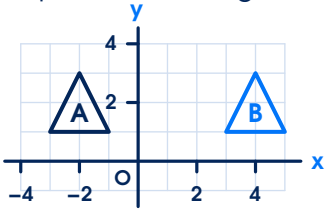
3 Each point has been reflected in a diagonal line. Find the equation of each mirror line.

a) (1, 4) → (3, 2) mirror line: ____

b) (−1, −1) → (3, 3) mirror line: ____

★ CHALLENGE FOR ALL

4 Shape B is the image of shape A.



a) Describe fully the reflection that maps A onto B.

b) Sam says it could also be a translation.
Explain why Sam is also right.

c) A shape that only fits a reflection: ____

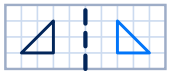
DESCRIBING REFLECTIONS · ANSWERS

ANSWERS

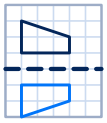
BUILDING BLOCKS

1 a) 5 · b) 2 · c) –1
2 a) vertical line halfway, 5 squares from the left · b) horizontal line halfway, 3 squares from the bottom
3 a) x = 1 · b) y = 1
4 a) x = 4 · b) y = 4

2a



2b



SUPPORT

1 a) x = –1 · b) y = –3.5 (halfway between y = –3 and y = –4)
2 a) x = 4 · b) y = 2 · c) x = –2
3 "Reflection in the line y = 1." The others do not give the mirror line (and "flipped" is not the mathematical word).
4 Reflection in the line x = 0 (the y-axis)

CORE

1 a) reflection in the line x = –1 · b) reflection in the line y = 1 · c) reflection in the line y = –x
2 a) x = 1 · b) y = –3 · c) y = x
3 y = 0 is the x-axis, but A and B are mirror images across the y-axis: matching points have the same y-coordinate and opposite x-coordinates. It is a reflection in the line x = 0.
4 B faces the same way as A: it has slid 4 squares to the right. A reflection would reverse the shape (it is a translation, not a reflection).

GREATER DEPTH

1 a) always · b) sometimes (only when the mirror line is horizontal) · c) never (it is y = b)
2 a) reflection in the line y = –x · b) reflection in the line x = 0.5
3 a) y = x + 1 (midpoint (2, 3); the line is at right angles to the join) · b) y = –x + 2 (or x + y = 2)
4 a) reflection in the line x = 1 · b) A is symmetrical about its own vertical line, so its mirror image looks the same as A moved 6 to the right: B is also A translated 6 units right · c) any shape with no vertical line of symmetry, e.g. a right-angled triangle