



Unit 15: Geometry – position and direction

Lesson 1: Reflection

→ pages 96–98

1. Reflections drawn:

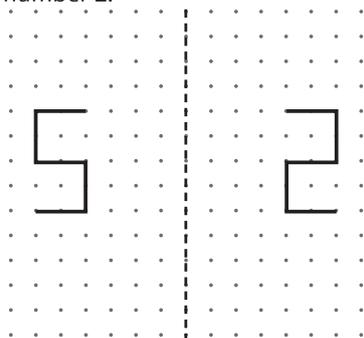
a) b)

c) d)

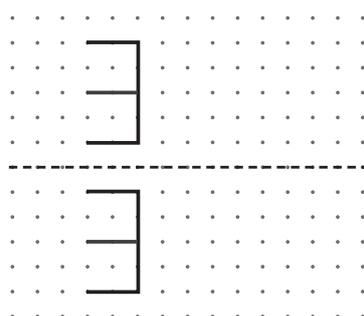
e)

2. Predictions may vary; for example:

a) I predict that the reflected shape will look like the number 2.



b) I predict that the reflected shape will look like the number 3.



3. Mirror lines drawn:

a) b) c) d)

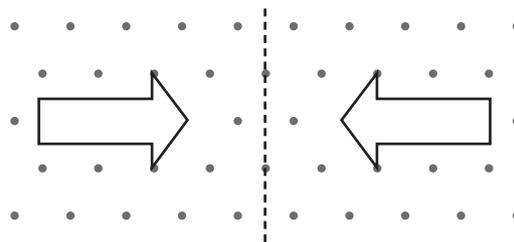
4. Reflections drawn:

a) b)

Reflect

Explanations may vary; for example:

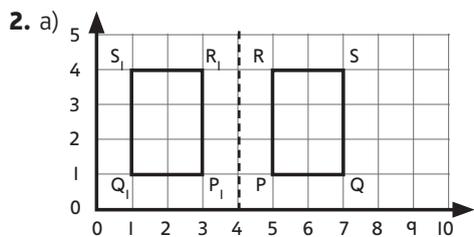
The size of the arrow stays the same but the arrow is reflected so that it is pointing to the right. The tip of the new shape is the same distance from the reflection line as the original shape.



Lesson 2: Reflection with coordinates

→ pages 99–101

- A (1,5) → A₁ (1,7)
 B (3,7) → B₁ (3,5)
 C (4,4) → C₁ (4,8)
 D (8,9) → D₁ (8,3)
 E (11,2) → E₁ (11,10)
 F (12,8) → F₁ (12,4)



- b) $P_1(3,1)$
 $Q_1(1,1)$
 $R_1(3,4)$
 $S_1(1,4)$

3. $A_1(2,4)$
 $B_1(5,2)$
 $C_1(8,0)$

4. $J_1(5,3)$
 $K_1(5,0)$
 $L_1(8,3)$
 $M_1(8,0)$

5. $P_1(25,75)$
 $Q_1(15,75)$
 $R_1(15,30)$

6.

Point	Inside original square	Inside reflected square	Outside both squares
(23,21)			✓
(25,5)		✓	
(29,5)			✓
(27,17)	✓		
(20,7)			✓
(10,10)			✓

Reflect

Answers will vary but should include calculating the distance from the mirror line to the point and using this to work out the value of the new coordinates, noting which coordinates will change and which ones will stay the same. For example:

Reflecting T in the horizontal line gives the new coordinate $T_1(9,2)$ and reflecting T in the vertical line gives $T_2(3,8)$.

Lesson 3: Translation

→ pages 102–104

1. Shapes translated:

a)

b)

c)

d)

2. 5 right, 1 up

3.

4. Isla is correct since the shape has moved in two directions (up and to the right), so is a translation. There is no mirror line which would reflect the two rectangles onto each other.

5. A: 8 right
 B: 4 left
6. A, B and C: 6 right, 2 down
 D: 6 right, 2 up

Reflect

5 left and 4 up.



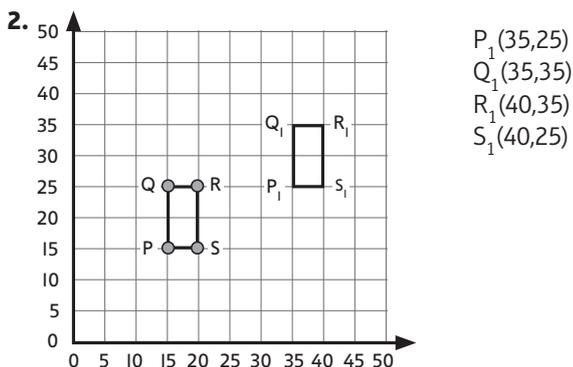
Lesson 4: Translation with coordinates

→ pages 105–107

1. a)

Translation	Position of Point A	Position of Point B	Position of Point C
Starting position	(1,1)	(5,3)	(11,6)
3 right	(4,1)	(8,3)	(14,6)
4 left	(0,1)	(4,3)	(10,6)
8 up	(0,9)	(4,11)	(10,14)
2 down	(0,7)	(4,9)	(10,12)
5 right, 4 down	(5,3)	(9,5)	(15,8)
Ending position	(4,10)	(8,12)	(14,15)

b) 3 right, 9 up



3. Order may vary:

Solution 1	Solution 2	Solution 3
Translation: 6 right, 2 up	Translation: 1 up	Translation: 1 left, 4 down
Vertices are: (10,6) (16,7) (17,12)	Vertices are: (4,5) (10,6) (11,11)	Vertices are: (3,0) (9,1) (10,6)

4. Before reflection in the mirror line, the right-angled vertex must have had coordinates (16,20). Its original coordinates were (5,5) so the translation is 11 right, 15 up.

Reflect

Methods may vary; for example:

Method 1: Take each vertex and work out where it would move to when translated by counting squares from its original position.

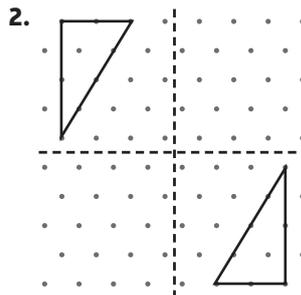
Method 2: Find the coordinates of each vertex and add/subtract from each coordinate depending on the direction and distance of the translation to find their new positions.

End of unit check

→ pages 108–110

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1. A(53,25)
B(67,25)
C(77,25)
D(82,13)
E(72,13)



Power puzzle

Answers will vary; look for children recognising that the size of the image does not change but reflecting a shape twice will produce the original shape.