# Reasoning and Problem Solving
## Step 5: Lines of Symmetry

## National Curriculum Objectives:

Mathematics Year 4: (4G2b) Identify lines of symmetry in 2-D shapes presented in different orientations

## Differentiation:

Questions 1, 4 and 7 (Reasoning)
**Developing** Find and explain the mistake that has been made when sorting shapes into a Venn diagram. 3 simple regular polygons with up to 2 lines of symmetry used. All shapes in 'standard' orientation.
**Expected** Find and explain the mistake that has been made when sorting shapes into a Venn diagram. 4 regular polygons with up to 8 lines of symmetry used. All shapes in the same 'non-standard' orientation in each question.
**Greater Depth** Find and explain the mistake that has been made when sorting shapes into a Venn diagram. 5 irregular polygons with any number of lines of symmetry used. All shapes in unique orientations.

Questions 2, 5 and 8 (Problem Solving)
**Developing** Find all the lines of symmetry (up to 2) in an image made up of multiple shapes. Up to 4 simple regular polygons used, all in 'standard' orientation.
**Expected** Find all the lines of symmetry (up to 8) in an image made up of multiple shapes. Up to 8 regular polygons used, in a mix of 'standard' and 'non-standard' orientations.
**Greater Depth** Find all the lines of symmetry (any number) in an image made up of multiple shapes. Up to 12 irregular polygons used, all in 'non-standard' orientations.

Questions 3, 6 and 9 (Reasoning)
**Developing** Find the symmetrical shape from a set of 2 shapes and explain what makes it symmetrical. Simple shapes with up to 4 sides used, with one obviously asymmetrical.
**Expected** Find the 2 asymmetrical shapes from a set of 3 shapes and explain what makes each of them asymmetrical. More complex shapes with up to 8 sides used, with more subtle reasons for asymmetry.
**Greater Depth** Find the 3 asymmetrical shapes from a set of 4 shapes and explain what makes each of them asymmetrical. Very complex shapes with any number of sides used, with very subtle reasons for asymmetry.
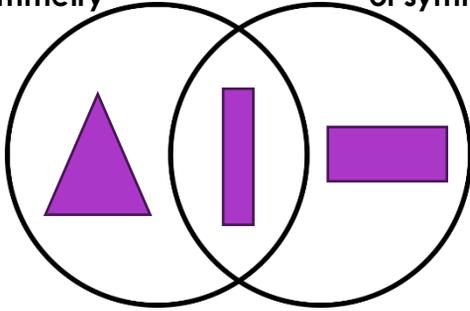
More Year 4 Properties of Shape resources.

Did you like this resource? Don't forget to review it on our website.

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# Lines of Symmetry

# Lines of Symmetry

**1a.** Alex has filled in this Venn diagram with shapes.

Vertical line of symmetry          Horizontal line of symmetry
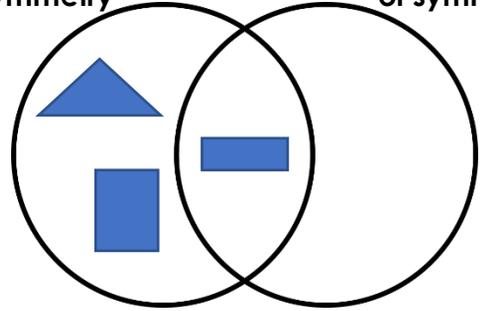
**Find and explain his mistake.**

R

**1b.** Bryce has filled in this Venn diagram with shapes.

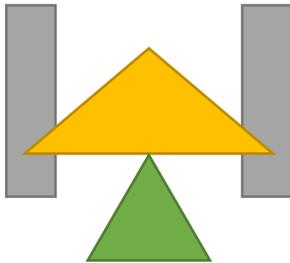Vertical line of symmetry          Horizontal line of symmetry

**Find and explain her mistake.**

R

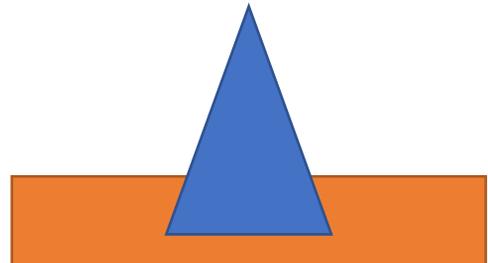**2a.** Here is an image made up of several shapes.

**How many lines of symmetry does the image (not the individual shapes) have?**

PS
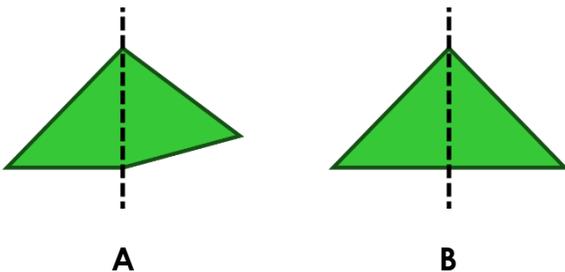
**2b.** Here is an image made up of several shapes.

**How many lines of symmetry does the image (not the individual shapes) have?**

PS

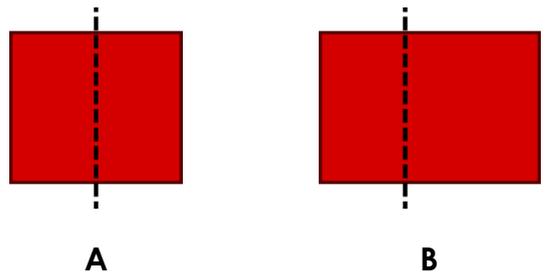**3a.** Here are 2 attempts at drawing reflections.

A                    B

**Find the reflection that is not symmetrical. Explain why.**

R

**3b.** Here are 2 attempts at drawing reflections.

A                    B

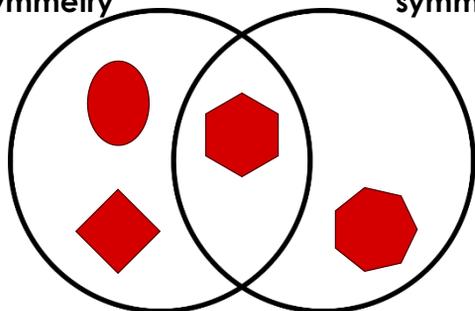**Find the reflection that is not symmetrical. Explain why.**

R

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**Reasoning and Problem Solving – Lines of Symmetry – Year 4 Developing**

**4a.** Pauline has filled in this Venn diagram with shapes.

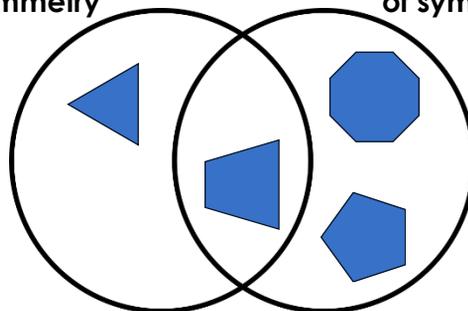Vertical line of symmetry      > 3 lines of symmetry

**Find and explain her mistake.**

**4b.** Abdalla has filled in this Venn diagram with shapes.

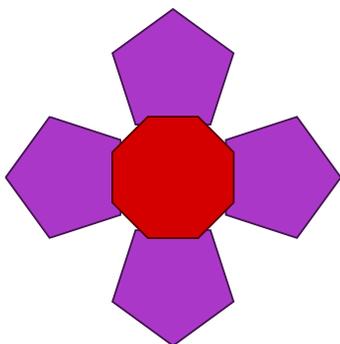< 4 lines of symmetry      Horizontal line of symmetry

**Find and explain his mistake.**

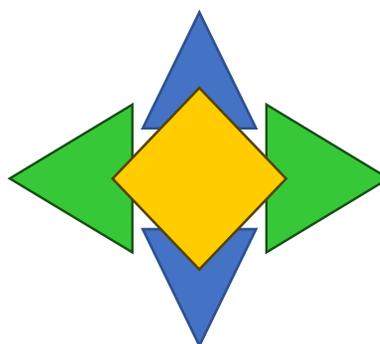**5a.** Here is an image made up of several shapes.

**How many lines of symmetry does the image (not the individual shapes) have?**

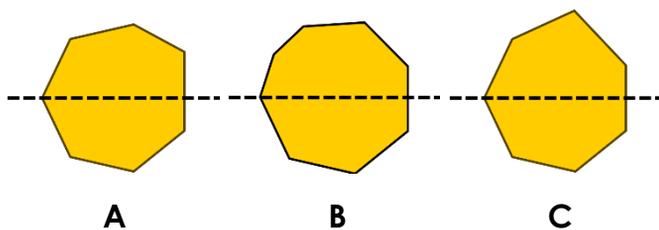**5b.** Here is an image made up of several shapes.

**How many lines of symmetry does the image (not the individual shapes) have?**
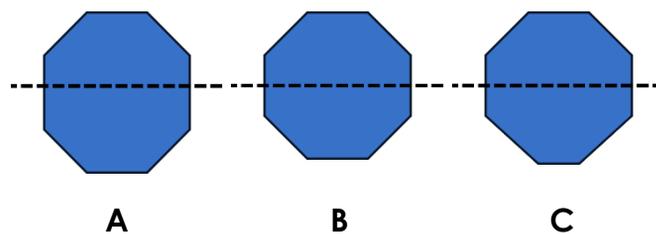
**6a.** Here are 3 attempts at drawing reflections.

A      B      C

**Find the reflections that are not symmetrical. Explain why.**

**6b.** Here are 3 attempts at drawing reflections.

A      B      C

**Find the reflections that are not symmetrical. Explain why.**

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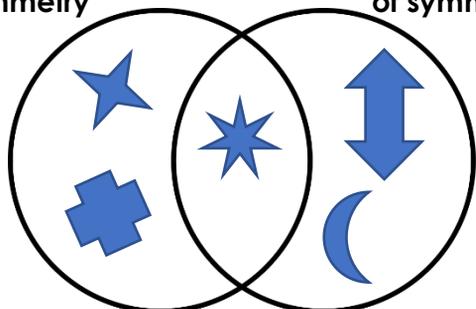**Reasoning and Problem Solving – Lines of Symmetry – Year 4 Expected**

**7a.** Ollie has filled in this Venn diagram with shapes.

> 5 lines of symmetry
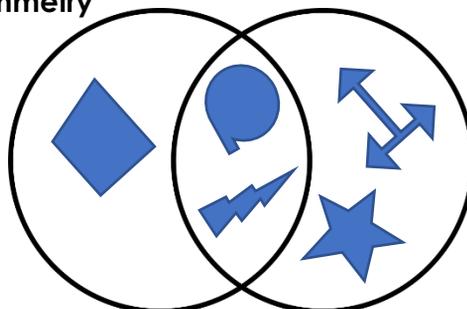
Horizontal line of symmetry

Find and explain his mistake.

R

**7b.** Justine has filled in this Venn diagram with shapes.
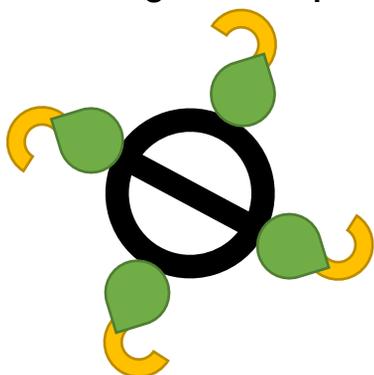
No lines of symmetry

> 4 sides

Find and explain her mistake.

R

**8a.** Here is an image made up of several shapes.

How many lines of symmetry does the image (not the individual shapes) have?

PS

**8b.** Here is an image made up of several shapes.
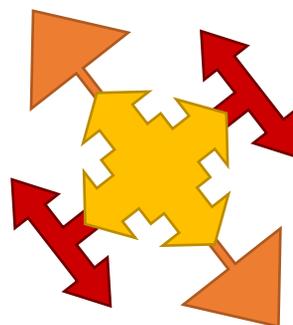
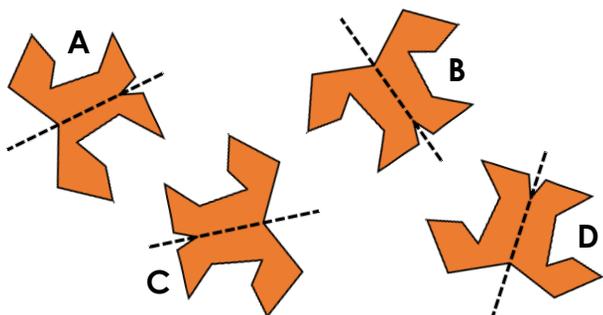How many lines of symmetry does the image (not the individual shapes) have?

PS

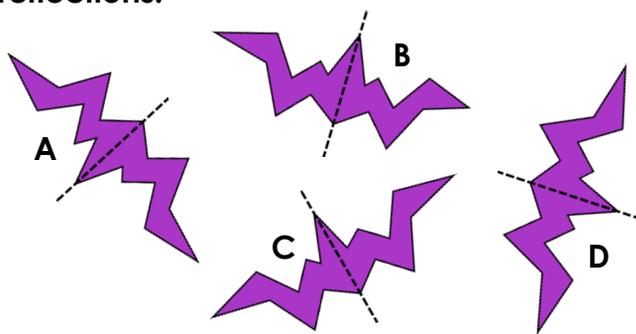**9a.** Here are 4 attempts at drawing reflections.

A

B

C

D

Find the reflections that are not symmetrical. Explain why.

R

**9b.** Here are 4 attempts at drawing reflections.

B

A

C

D

Find the reflections that are not symmetrical. Explain why.

R

# Reasoning and Problem Solving
## Lines of Symmetry

**Developing**

**1a.** Alex has put a rectangle in the 'Horizontal line of symmetry' section when it also has a vertical line of symmetry. It should be in the central section instead.

**2a.** The image has 1 line of symmetry.

**3a.** Shape A is not symmetrical. The right-hand corner is higher than the left-hand corner.

**Expected**

**4a.** Pauline has put the rhombus in the 'Vertical line of symmetry' section when it also has more than 3 lines of symmetry in total. It should be in the central section instead.

**5a.** The image has 4 lines of symmetry.

**6a.** Shapes A, B and C are not symmetrical. The right-hand side of shape A is longer above the line of symmetry than below it. Shape B has 5 sides above the line of symmetry and only 4 below it. Shape C's most central top corner is further from the line of symmetry than the corresponding corner on the lower part of the shape.

**Greater Depth**

**7a.** Ollie has put the 7-pointed star in the central section when it does not have a horizontal line of symmetry. It should be in the '> 5 lines of symmetry' section instead.

**8a.** The image has 0 lines of symmetry.

**9a.** Shapes A and D are not symmetrical. Shape A has 2 sides which run almost parallel to the line of symmetry; the side below the line is closer to the line of symmetry than the one above. The protrusion at the bottom of shape D is slightly smaller on the right-hand side of the line of symmetry than the left.

# Reasoning and Problem Solving
## Lines of Symmetry

**1b.** Bryce has put a rectangle in the 'Vertical line of symmetry' section when it also has a horizontal line of symmetry. It should be in the central section instead.

**2b.** The image has 1 line of symmetry.

**3b.** Shape B is not symmetrical. The top and bottom sides are much longer on the right-hand part of the shape.

**4b.** Abdalla has put the triangle in the '< 4 lines of symmetry' section when it also has a horizontal line of symmetry. It should be in the central section instead.

**5b.** The image has 2 lines of symmetry.

**6b.** Shapes A and C are not symmetrical. The right and left-hand sides of shape A are longer below the line of symmetry than above it. The bottom side of shape C is narrower than the top side.

**7b.** Justine has put the star in the '> 4 sides' section when it also has no lines of symmetry. It should be in the central section instead.

**8b.** The image has 2 lines of symmetry.

**9b.** Shapes A, B and C are not symmetrical. The first complete 'zig-zags' on each side of the line of symmetry in shape A do not match. The sides which make up the rightmost angle in shape B are smaller than their leftmost equivalents. The topmost angle split by the line of symmetry in shape C is not equal on both sides of the line.

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