Merit Tutoring

WORKSHEET 43

LINES OF SYMMETRY

Year 5 Mathematics — Australian Curriculum v9.0

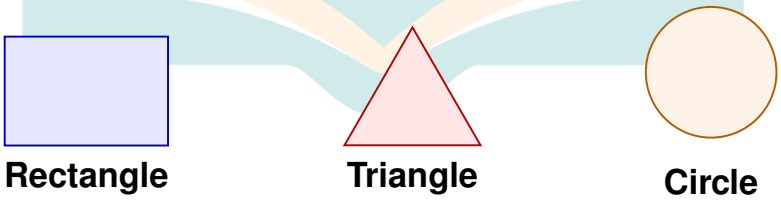
Strand: Space | **Sub-strand:** Shape | **Code:** AC9M5SP03

Name: _____ **Date:** _____

Key Concept: A line of symmetry divides a shape into two halves that are mirror images of each other. When you fold along the line of symmetry, both halves match perfectly.

Section 1 — Fluency: Identifying Lines of Symmetry

Question 1: Draw all the lines of symmetry for each shape shown below:



Rectangle Triangle Circle

Question 2: How many lines of symmetry does a square have?

Answer: _____

Question 3: Does a scalene triangle have any lines of symmetry?

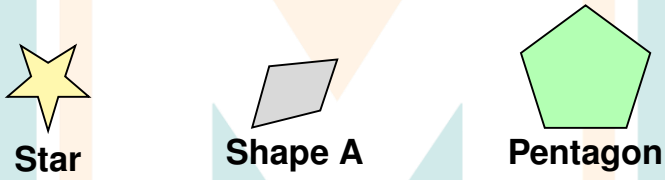
Answer: _____

Question 4: Draw a simple shape that has exactly 1 line of symmetry.

Question 5: True or False: An equilateral triangle has 3 lines of symmetry.

Answer: _____

Question 6: Circle the shapes below that have at least one line of symmetry:



Question 7: How many lines of symmetry does a regular hexagon have?

Answer: _____

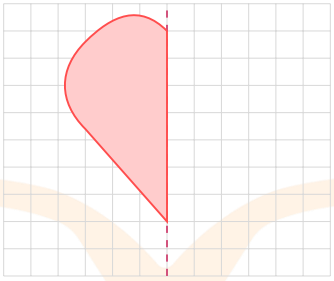
Symmetry Swan!

You're gliding through lines of symmetry!

Joke: Why was the book about symmetry so easy to read?
Because the second half was just a reflection of the first!

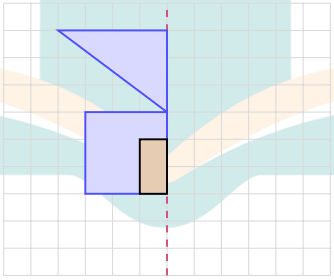
Section 2 — Reasoning: Completing Symmetrical Shapes

Question 8: Complete the drawing so that it is perfectly symmetrical across the dashed line:



Heart

Question 9: Complete this symmetrical house across the dashed line:

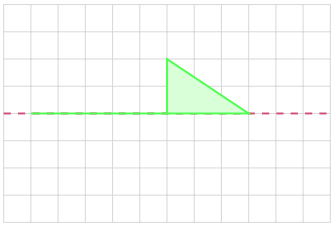


House

Question 10: If you fold a shape along its line of symmetry, what happens?

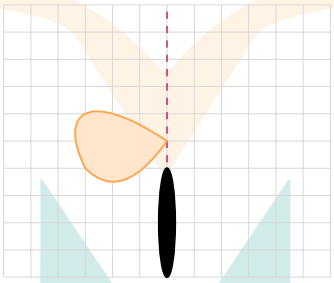
Answer: _____

Question 11: Draw the other half of this arrow to make it symmetrical:



Arrow

Question 12: Complete the butterfly wing to make it symmetrical:



Butterfly

Question 13: Explain why the letter ”A” has a vertical line of symmetry.

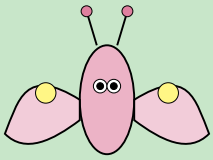
Answer: _____

_____

Question 14: Does a rectangle have horizontal and vertical lines of symmetry? Explain.

Answer: _____

_____



Mirror-Image Moth!

You're perfectly completing symmetrical shapes!

Joke: What did one symmetrical shape say to the other? "We're two of a kind!"

Section 3 — Challenge: Letters and Symbols

Question 15: Which capital letters in the word "MATH" have a vertical line of symmetry?

Answer: _____

Question 16: Which capital letters in the word "MATH" have a horizontal line of symmetry?

Answer: _____

Question 17: List all the capital letters of the alphabet that have at least one line of symmetry.

Answer: _____

_____

Question 18: Does the number "8" have any lines of symmetry? If yes, how many?

Answer: _____

Question 19: Draw a simple design or pattern that has exactly 2 lines of symmetry.

Question 20: The Australian flag has a Union Jack in the corner. Does the Union Jack have any lines of symmetry?

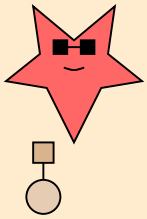
Answer: _____

Question 21: Look at road signs. Why do you think many road signs are symmetrical?

Answer: _____

_____

Question 22: Create your own symmetrical logo or symbol using simple shapes. Draw it below and mark the line(s) of symmetry.



Reflection Rockstar!

You've mastered letters, symbols, and symmetry!

Joke: Why did the symmetrical shape become a musician?
Because it knew how to reflect great rhythm!

Excellent Work! You've completed Worksheet 43!

WORKSHEET 43
ANSWER KEY

Section 1 — Fluency: Identifying Lines of Symmetry

1. Rectangle: 2 lines of symmetry (one vertical through the center, one horizontal through the center); Equilateral Triangle: 3 lines of symmetry (one through each vertex to the midpoint of the opposite side); Circle: infinite lines of symmetry (any diameter is a line of symmetry)
2. 4 lines of symmetry
3. No
4. Student drawing should show a shape with exactly one line of symmetry (examples: isosceles triangle, heart shape, kite, semicircle)
5. True
6. Star and Pentagon should be circled (both have lines of symmetry)
7. 6 lines of symmetry

Section 2 — Reasoning: Completing Symmetrical Shapes

8. Student should complete the right half of the heart by mirroring the left side across the dashed vertical line
9. Student should complete the right half of the house by mirroring the left side (including door and roof) across the dashed vertical line
10. The two halves match perfectly and overlap exactly
11. Student should draw the bottom half of the arrow by mirroring the top half across the dashed horizontal line
12. Student should complete the right wing by mirroring the left wing across the dashed vertical line

13. The letter ”A” has a vertical line of symmetry because if you draw a line down the middle from top to bottom, the left and right sides are mirror images of each other

14. Yes, a rectangle has both horizontal and vertical lines of symmetry because it has two pairs of equal opposite sides and both center lines create matching halves

Section 3 — Challenge: Letters and Symbols

15. M, A (both have vertical lines of symmetry)

16. None (no letters in ”MATH” have horizontal lines of symmetry)

17. A, B, C, D, E, H, I, M, O, T, U, V, W, X, Y (letters with at least one line of symmetry)

18. Yes, 2 lines of symmetry (one vertical and one horizontal)

19. Student drawing should show a design with exactly 2 lines of symmetry (examples: rectangle, oval, simple cross, letter H)

20. Yes (vertical and horizontal lines of symmetry through the center)

21. Symmetrical signs are easier to recognize and understand quickly from any direction; they look balanced and professional; symmetry helps with safety and clarity

22. Student’s creative symmetrical logo with marked line(s) of symmetry

WORKSHEET 44

ROTATIONAL SYMMETRY & PATTERNS

Year 5 Mathematics — Australian Curriculum v9.0

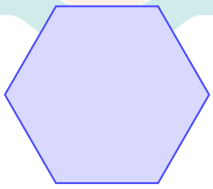
Strand: Space | **Sub-strand:** Shape | **Code:** AC9M5SP03

Name: _____ **Date:** _____

Key Concept: A shape has rotational symmetry if it looks the same after being rotated (turned) less than a full 360-degree turn. The order of rotational symmetry tells us how many times the shape looks identical during one complete rotation.

Section 1 — Fluency: Rotational Order

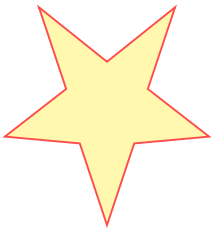
Question 1: How many times will this regular hexagon look exactly the same during one full 360-degree turn?



Regular Hexagon

Answer: _____

Question 2: What is the order of rotational symmetry for this star?



5-Pointed Star

Answer: _____

Question 3: Does a rectangle have rotational symmetry? If yes, what order?

Answer: _____

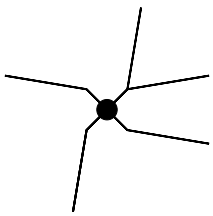
Question 4: A square has rotational symmetry of order:

Answer: _____

Question 5: True or False: All circles have infinite rotational symmetry.

Answer: _____

Question 6: This pinwheel has rotational symmetry. What is its order?

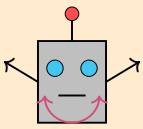


Pinwheel

Answer: _____

Question 7: At what angle will a square look the same during rotation?

Answer: _____



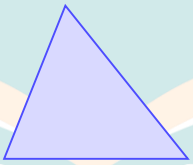
Rotation Robot!

You're spinning through rotational symmetry!

Joke: Why did the shape love dancing? Because it had perfect rotational moves!

Section 2 — Reasoning: Symmetrical or Not?

Question 8: Does this scalene triangle have any lines of symmetry?



Scalene Triangle

Answer: _____

Question 9: Explain why a scalene triangle does not have any lines of symmetry.

Answer: _____

_____

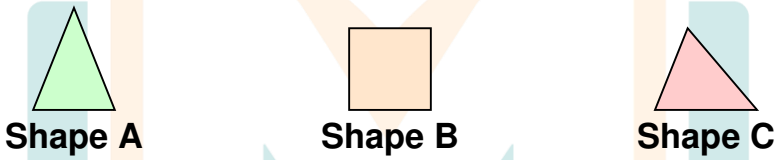
Question 10: Does an isosceles triangle have rotational symmetry?

Answer: _____

Question 11: Which has more lines of symmetry: a square or a rectangle (non-square)?

Answer: _____

Question 12: Look at the shapes below. Which one has BOTH line symmetry AND rotational symmetry?



Answer: _____

Question 13: Can a shape have rotational symmetry but no line symmetry? Give an example.

Answer: _____

_____

Question 14: What is the difference between line symmetry and rotational symmetry?

Answer: _____

_____

Pattern Panda!

You're reasoning through symmetry like a pro!

Joke: What do you call a bear with no teeth? A gummy bear—but this panda has perfect symmetry!

Section 3 — Challenge: Creating Patterns

Question 15: Draw a simple pattern that has both horizontal and vertical lines of symmetry.

Question 16: If a shape has a rotational symmetry of order 2, what kind of turn makes it look the same? (Quarter turn, Half turn, or Full turn?)

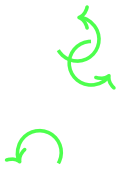
Answer: _____

Question 17: Create a design with rotational symmetry of order 3. Draw it below.

Question 18: How many lines of symmetry does a regular octagon have?

Answer: _____

Question 19: Look at the recycling symbol. Does it have rotational symmetry? If yes, what order?



Recycling Symbol

Answer: _____

Question 20: Find three objects in your classroom or home that have symmetry. Describe them.

Object 1: _____

Object 2: _____

Object 3: _____

Question 21: Why do you think symmetry is important in architecture and building design?

Answer: _____

_____

Question 22: Challenge: Design a company logo that has both line symmetry and rotational symmetry of order 4. Draw and explain your design.

Symmetry Star Champion!

You've conquered patterns and symmetry challenges!

Joke: Why was the symmetrical pattern so popular? Because it was well-balanced in every way!

Outstanding! You've completed Worksheet 44!

WORKSHEET 44
ANSWER KEY

Section 1 — Fluency: Rotational Order

1. 6 times (order of rotational symmetry is 6)
2. Order 5 (the star looks the same 5 times during a full rotation)
3. Yes, order 2 (it looks the same after a 180-degree turn)
4. 4
5. True
6. Order 4 (or possibly 6 depending on blade count—accept reasonable answers based on the diagram)
7. 90

   (or every quarter turn)

Section 2 — Reasoning: Symmetrical or Not?

8. No
9. A scalene triangle has no lines of symmetry because all three sides are different lengths and all three angles are different, so there's no way to divide it into two matching halves
10. No (an isosceles triangle has line symmetry but not rotational symmetry)
11. A square (4 lines of symmetry vs. 2 for a non-square rectangle)
12. Shape B (Square) has both line symmetry and rotational symmetry
13. Yes; Example: the letter "S" or "Z" or an irregular pinwheel (these have rotational symmetry of order 2 but no line symmetry)

14. Line symmetry is when a shape can be divided by a line into two mirror-image halves. Rotational symmetry is when a shape looks the same after being turned less than 360 degrees around a center point

Section 3 — Challenge: Creating Patterns

15. Student drawing should show a pattern with both horizontal and vertical lines of symmetry (examples: cross, square pattern, circle with cross inside, simple flower with 4 petals)
16. Half turn (180 degrees)
17. Student drawing should show a design that looks the same 3 times during a full rotation (examples: three-bladed propeller, Mercedes symbol, Y-shape with three equal arms at 120-degree intervals)
18. 8 lines of symmetry
19. Yes, order 3 (it looks the same after 120-degree, 240-degree, and 360-degree rotations)
20. Student answers will vary (examples: clock face, window, door, book cover, computer screen, chair, table, scissors, etc.)
21. Symmetry in architecture provides balance, stability, aesthetic appeal, and structural integrity; symmetrical buildings are often more stable and pleasing to look at; symmetry can also make construction more efficient
22. Student drawing should show a logo with 4 lines of symmetry and rotational symmetry of order 4 (example: square with internal symmetrical design, cross shape, four-petaled flower design, etc.) with explanation of symmetry features

Fantastic Achievement!

You've mastered symmetry in all its forms!
From line symmetry to rotational patterns,
you're a true Symmetry Specialist!