

Symmetry

Class VI Mathematics – Worksheets

WORKSHEET-1

Section A: MCQs (PART-1) ($10 \times 1 = 10$ marks)

- How many lines of symmetry does a regular equilateral triangle possess?
 - 1
 - 2
 - 3
 - 0
- Which of the following geometric figures has exactly two lines of symmetry?
 - A rectangle
 - A square
 - A circle
 - A scalene triangle
- The number of lines of symmetry in a regular hexagon is equal to:
 - 4
 - 5
 - 6
 - Infinitely many
- Which capital letter of the English alphabet shows vertical reflection line symmetry?
 - B
 - M
 - E
 - N
- A circle has how many distinct lines of symmetry passing through its center?
 - 1
 - 4
 - 8
 - An infinite number
- What is the line of symmetry of an isosceles triangle called relative to its vertex angle?
 - Base side line
 - Median/Bisector
 - Hypotenuse line
 - External diagonal
- Which of the following shapes has zero lines of symmetry?
 - A scalene triangle
 - An isosceles triangle
 - A rhombus
 - A semi-circle
- A square has how many lines of symmetry?
 - 2
 - 3
 - 4
 - 6
- Which letter shows horizontal line reflection symmetry but not vertical symmetry?
 - A
 - K
 - O
 - X
- When an image is reflected across a mirror line, what happens to its orientation distance?
 - It doubles up
 - It remains identical but flips laterally
 - It becomes zero
 - It spins upside down

MCQs (PART-2) ($10 \times 1 = 10$ marks)

11. Which of the following English capital letters has exactly one vertical line of symmetry?

- a. Z b. M c. N d. F

12. A figure has exactly one line of symmetry and no rotational symmetry (other than 360°). Which of the following could it be?

- a. Square b. Rectangle c. Isosceles triangle d. Circle

13. A shape has rotational symmetry of order 8. What is its smallest angle of rotation?

- a. 30° b. 40° c. 45° d. 60°

14. Which of the following objects is most likely to have rotational symmetry but no line of symmetry?

- a. A three-bladed ceiling fan with curved blades b. A notebook
c. A window pane d. A ruler

15. A regular octagon has how many lines of symmetry?

- a. 4 b. 6 c. 8 d. 10

16. A figure looks the same after every 120° rotation. What is the order of its rotational symmetry?

- a. 2 b. 3 c. 4 d. 6

17. Which statement is always true for a circle?

- a. It has only one line of symmetry. b. It has exactly four angles of symmetry.
c. Every diameter is a line of symmetry. d. It has no rotational symmetry.

18. Which of the following figures has both reflection symmetry and rotational symmetry?

- a. Scalene triangle b. Regular hexagon c. Kite (ordinary) d. Trapezium

19. If the smallest angle of rotational symmetry of a figure is 72° , then the figure has rotational symmetry of order

- a. 4 b. 5 c. 6 d. 8

20. A designer creates a logo by arranging six identical petals equally around a centre. What is the smallest angle through which the logo can be rotated to look unchanged?

- a. 45° b. 60° c. 72° a. 90°

WORKSHEET-2

SECTION B: Short Answer (10×2=20 marks)

1. Define the core term 'Line of Symmetry' in your own words with respect to folding an object.

2. Draw a neat conceptual text example of an English alphabet letter that contains both a horizontal and a vertical line of symmetry.

3. State the exact total number of lines of symmetry present in a regular pentagon.

4. If a line segment of length 8 cm is symmetrical about an axis line, where does the axis intersect the segment?

5. Name a quadrilaterally balanced geometric shape that has exactly 4 lines of symmetry.

6. True or False: 'A parallelogram has exactly two distinct lines of symmetry across its principal diagonals.' Verify.

7. Write down the number of symmetric folding lines found in a standard isosceles trapezoid.

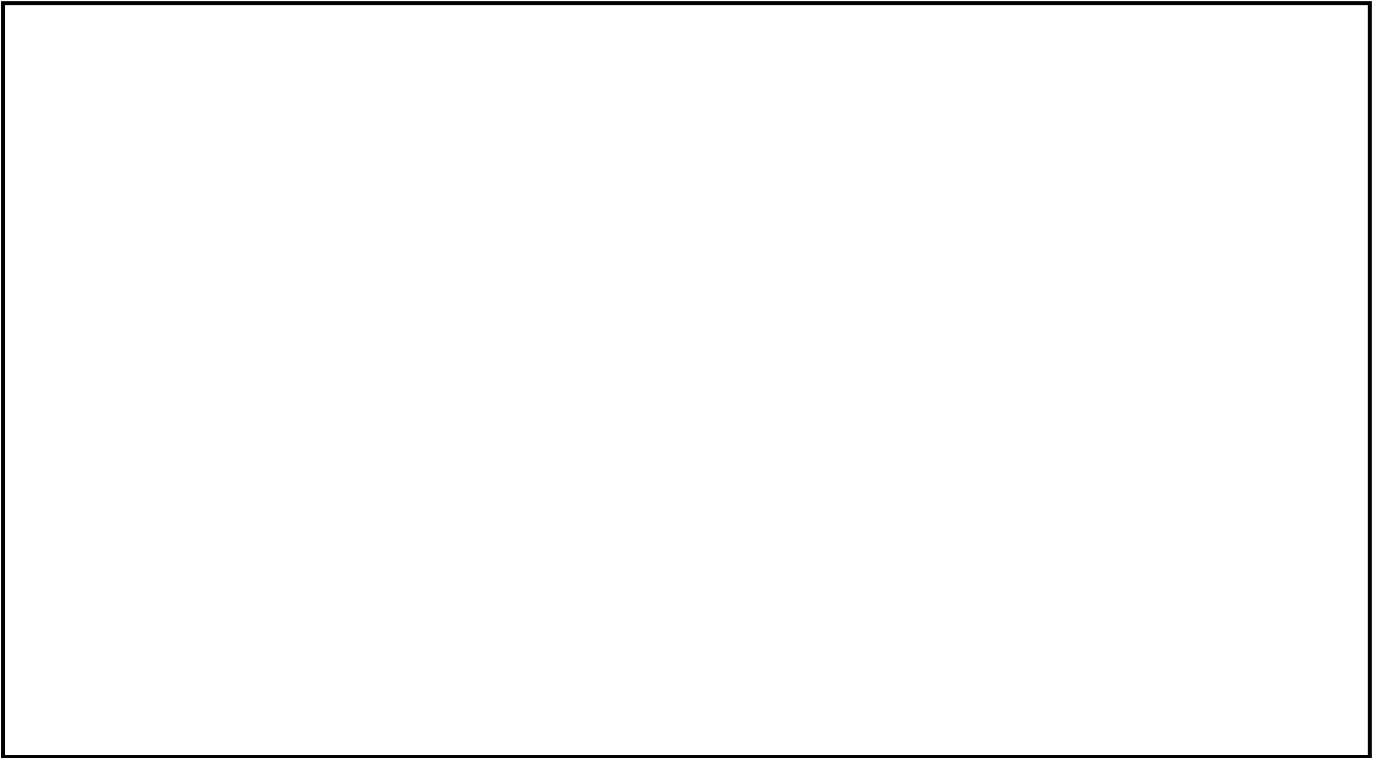
8. Draw or describe the orientation of the line of symmetry for the capital letter 'V'.

9. Give two distinct examples of symmetrical objects found commonly in natural environments.

10. Complete the missing structural alignment parameter: A kite shape is symmetrical across _____ diagonal(s).

Section C: Short Answer (6×3=18 Marks)

11. Sketch an Indian Place value grid layout style framework showing how a square and a rectangle differ in lines of symmetry across diagonals.



12. A symmetrical design contains half a pattern on a squared paper grid along with a vertical mirror line. Explain step-by-step how to trace the points to complete the image.



13. Identify all lines of symmetry for a regular quadrilateral shape (Square). Distinguish between median lines and diagonal axes lines.

14. Find the values of 'x' and 'y' if x represents the lines of symmetry of an equilateral triangle and y represents the lines of symmetry of a regular octagon.

15. A design studio creates a brand logo using a combination of a circle and an embedded rhombus. Calculate the net total lines of symmetry for this integrated logo form.

16. Draw a line segment measuring 7 cm. Using a folding logic setup, explain how its perpendicular bisector functions as its axis of mirror reflection symmetry.

Section D: Long Answer ($4 \times 5 = 20$ marks)

17. An architectural structural layout template outlines a series of columns arranged across a centralized floor plan axis. The primary baseline coordinate points are mapped symmetrically on a coordinate grid line. A column positioned at coordinates $(-4, 5)$ needs a matching symmetrical counterweight column on the right side across the vertical Y-axis mirror line. Find its reflection coordinate points and verify why the distance parameter matches perfectly.

18. Explore the symmetric structural layout properties of regular polygons. Write a detailed mathematical rule that links the total number of sides of any regular polygon to its total lines of symmetry. Provide explicit step-by-step verification examples using a regular triangle, a square, a regular pentagon, and a regular hexagon.

19. A standard mirror reflection operation is conducted on a clock interface tracking time metrics. If the real-time clock position shows exactly 3:00, determine the apparent lateral reflection time position displayed on an opposite vertical wall mirror plane. Detail the geometric angle symmetry transformations step by step.

20. Construct an abstract composite layout problem featuring an arrangement of a regular triangle nested inside a square. Design the nesting configuration such that the final total system assembly displays exactly 1 master line of symmetry. Explain the spatial alignment requirements step by step.

Case Study Based (2×4= 8 Marks)

Contextual Passage: A textile design firm creates symmetrical floral embroidery motifs for traditional fabrics. The primary layout uses a balanced axis grid mapped directly onto a tracing grid sheets arrangement. To optimize machinery stitching sequences, motifs must follow strict reflexive parameters: Net Line Density Baseline = $36 / [x + \{2 * (y - 1)\}]$, where x is the number of lines of symmetry in a regular triangle and y is the lines of symmetry in a standard rectangle. This metric prevents fabric warp and maintains geometric equilibrium.

22. If the pattern changes and the rectangle component y is upgraded to a regular square patch profile, re-evaluate the system expression to find the updated machinery stitching configuration.

Self Assessment:

I understood all the concepts

☐ Yes

☐ No

I need more practice

☐ Yes

☐ No

Name of Concepts having doubts/Not Cleared: _____

Parent's Assessment:

My ward understood all the concepts

☐ Yes

☐ No

He/She need more practice

☐ Yes

☐ No

Name of Concepts having doubts/Not Cleared: _____

Signature of Parent:

Teacher's Assessment

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Answers Worksheet 1:

Q.No.	1	2	3	4	5	6	7	8	9	10
Ans	c	a	c	b	d	b	a	c	b	B
Q.No.	11	12	13	14	15	16	17	18	19	20
Ans	b	c	c	a	c	b	c	b	b	b

Answers Worksheet 2:

Q.No.	1	2	3	4	5	6	7	8	9	10
Ans	Folding axis...	H, O, or X	5	At midpoint (4cm)	Square	False (0 lines)	1 line	Vertical center	Leaf, Butterfly	one (1)
Q.No.	11	12	13	14	15	16	17	18	19	20
Ans	Grid/Diag setup	Reflex trace	4 total lines	x=3, y=8	4 lines total	Perp bisector	(4, 5)	Rule: n lines	9:00 position	Triangle inside sq
Q.No.	21	22								
Ans	7.2 density index	4 density index								