Symmetry

Standard difficulty · 20 questions · 40 marks · Time: 28 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. How many lines of symmetry does a regular hexagon have?
(a) 5 **(b)** 6 **(c)** 7 **(d)** 12

2. What is the smallest angle of rotational symmetry of a regular hexagon?
(a) 60° **(b)** 30° **(c)** 90° **(d)** 61°

3. How many lines of symmetry does a square have?
(a) 2 **(b)** 1 **(c)** 4 **(d)** 8

4. Which of these capital letters has a vertical line of symmetry?
(a) Z **(b)** N **(c)** G **(d)** X

5. A design looks exactly the same 36 times during one full turn. Its smallest angle of symmetry is:
(a) 10° **(b)** 5° **(c)** 36° **(d)** 350°

6. How many times does a regular nonagon look exactly the same as it turns once all the way round?
(a) 9 **(b)** 18 **(c)** 8 **(d)** 1

7. The angles of symmetry of a rectangle that is not a square are:
(a) 90° and 180° **(b)** 180° and 360°
(c) 90°, 180°, 270° and 360° **(d)** only 90°

8. Which of these turns does NOT leave a regular decagon looking the same?
(a) 180° **(b)** 324° **(c)** 65° **(d)** 108°

Section B — Short answer — 8 × 2 = 16 marks

9. Write the three smallest angles of rotational symmetry of an equilateral triangle.

10. A figure has a smallest angle of symmetry of 120°. How many times does it look the same during one full turn?

11. Find the total number of lines of symmetry of a regular hexagon, a regular octagon and a kite shape.

12. Which of these capital letters have at least one line of symmetry: N, C, M, S, R, P?

13. A point is 29 cm from a mirror line. How far is it from its mirror image?

14. A regular polygon has a smallest angle of symmetry of 90°. How many sides does it have, and how many lines of symmetry?

15. Which of these turns leave a regular decagon looking the same: 260°, 320°, 324°, 340°?

16. Which of these capital letters look the same after a half turn (180°): I, N, S, P, Q, V?

Section C — Word problems — 4 × 4 = 16 marks

17. A rangoli design has 4 identical petals around its centre. It looks the same after each turn of the same size. What is the smallest such turn, and how many lines of symmetry does it have if every petal is symmetrical?

18. A bicycle wheel has 20 identical spokes, evenly spaced. Through what smallest angle must it turn to look the same? How many times does it look the same in one full turn?

19. Isha draws a square and Rohan draws a regular 19-sided polygon. Who has drawn the shape with more lines of symmetry, and by how many?

20. Dev folds a sheet of paper in half and punches a hole 13 cm from the fold. When the paper is opened, how far apart are the two holes? What is the fold called?

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Answer key

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Q	Answer	Working
1	**(b) 6**	a regular shape with 6 sides has 6 lines of symmetry
2	**(a) 60°**	360° ÷ 6 = 60°
3	**(c) 4**	2 through the middles of the sides, 2 along the diagonals
4	**(d) X**	X is the same on both sides of a vertical line
5	**(a) 10°**	360° ÷ 36 = 10°
6	**(a) 9**	it fits onto itself every 40°
7	**(b) 180° and 360°**	—
8	**(c) 65°**	the turns that work are multiples of 36°
9	**120°, 240°, 360°**	multiples of 360° ÷ 3 = 120°
10	**3**	360° ÷ 120° = 3
11	**15**	6 + 8 + 1 = 15
12	**C, M**	C (horizontal), M (vertical)
13	**58 cm**	29 cm to the line and 29 cm on the other side
14	**4 sides; 4 lines**	360° ÷ 90° = 4
15	**324°**	only multiples of 36° work
16	**I, N, S**	turn the page upside down and look
17	**90°; 4 lines**	360° ÷ 4 = 90°; one line through each petal
18	**18°; 20 times**	360° ÷ 20 = 18°
19	**Rohan, by 15**	4 and 19 lines
20	**26 cm; a line of symmetry**	13 cm on each side of the fold