

## Lines of Symmetry

A line of symmetry is a fold line that makes both halves of a shape match perfectly. Some shapes have one, some have many, and some have none.

Shape	Lines of symmetry
Square	4
Rectangle (not square)	2
Equilateral triangle	3
Isosceles triangle	1
Circle	infinitely many
Scalene triangle	0

### Key Concepts

1. A **line of symmetry** is an imaginary fold line that splits a shape into two matching halves.
2. A shape has *as many* lines of symmetry as the number of ways you can fold it so both halves match.
3. A **regular** polygon has the same number of lines of symmetry as it has sides. Squares: 4, equilateral triangles: 3, regular hexagons: 6, etc.
4. **Circles** have infinite lines of symmetry — every line through the center works.

### Worked Examples

① How many lines of symmetry does a square have?

 Try folding a square: vertical, horizontal, and the two diagonals all create matching halves. Total: 4.

 **Answer:** 4

② Does the letter B have a horizontal line of symmetry?

 Fold B horizontally (top half onto bottom half). The two bumps on the right side match up, and the vertical line on the left matches itself. So yes, B has a horizontal line of symmetry.

 **Answer:** Yes

③ How many lines of symmetry does an equilateral triangle have?

 An equilateral triangle has 3 equal sides. Each fold line goes from a vertex to the middle of the opposite side, giving 3 lines of symmetry total.

 **Answer:** 3

### Practice Problems

Find the number of lines of symmetry.

- |   |       |  |       |
|---|-------|--|-------|
| 1. Square $\Rightarrow$ ___ lines                 | _____ | 7. Letter A $\Rightarrow$ ___ line(s)        | _____ |
| 2. Rectangle (not square) $\Rightarrow$ ___ lines | _____ | 8. Letter S $\Rightarrow$ ___ line(s)        | _____ |
| 3. Equilateral triangle $\Rightarrow$ ___ lines   | _____ | 9. Heart shape $\Rightarrow$ ___ line(s)     | _____ |
| 4. Circle $\Rightarrow$ ___ lines                 | _____ | 10. Regular pentagon $\Rightarrow$ ___ lines | _____ |
| 5. Regular hexagon $\Rightarrow$ ___ lines        | _____ | 11. Scalene triangle $\Rightarrow$ ___ lines | _____ |
| 6. Isosceles triangle $\Rightarrow$ ___ line(s)   | _____ | 12. Regular octagon $\Rightarrow$ ___ lines  | _____ |

### Study Tips

-  Picture folding the shape in half. If the two halves overlap exactly, the fold line is a line of symmetry.
-  Regular polygons (all sides and angles equal) have one line of symmetry per side.
-  Letters like A, M, T, U have one vertical line of symmetry. Letters like B, C, D, E have one horizontal line.

### Word Problems

1. Kai draws a regular hexagon for art class. How many lines of symmetry does it have?

Answer: \_\_\_\_\_

2. Emily folds a heart-shaped card in half. Both sides match. How many lines of symmetry does a heart have?

Answer: \_\_\_\_\_

**Answer Key — with Friendly Explanations****Practice Problems**

1. Vertical, horizontal, 2 diagonals.  **Answer:** 4
2. Vertical and horizontal only.  **Answer:** 2
3. One line from each vertex to opposite side.  **Answer:** 3
4. Any line through the center works.  **Answer:** *Infinitely many*
5. One line per side.  **Answer:** 6
6. One line from the apex to the base midpoint.  **Answer:** 1
7. Vertical line down the middle.  **Answer:** 1
8. S has no line of symmetry (only rotational).  **Answer:** 0
9. Vertical line through the middle.  **Answer:** 1
10. Regular pentagon: 5 lines.  **Answer:** 5
11. All sides different = no line of symmetry.  **Answer:** 0
12. Regular octagon: 8 lines.  **Answer:** 8

**Word Problems**

1. Regular hexagon: 6 lines.  **Answer:** 6
2. Heart: one vertical line.  **Answer:** 1

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