**SYMMETRY**

**KEY POINTS TO REMEMBER:**

* **SYMMETRY:** Symmetry comes from a Greek word meaning “to measure together”. Mathematically symmetry means that one shape becomes exactly like another when you move it in some way: turn, flip or slide.
* **Line symmetry: Line symmetry** is when a line can be drawn dividing the figure into two identical parts. The line is called the line of symmetry. The line of symmetry can be in any direction.
* **Vertical line symmetry:** if the line of symmetry is such that it is drawn from upside to downside or downside to upside.
* **Horizontal line symmetry:** if the line of symmetry is such that it is drawn from left to right or right to left.
* **Lines of symmetry in a figure:** a figure may have no line of symmetry, only one line of symmetry, two lines of symmetry or multiple lines of symmetry.

ISOSCELES TRIANGLE SQUARE RECTANGLE

NO INFINITE

LINE LINES

SCALENE TRIANGLE REGULAR PENTAGON CIRCLE

* **Reflection symmetry:** it is closely related to line symmetry. In reflection symmetry the object and its image are symmetrical with reference to the mirror line.
* **Number of lines of symmetry in Regular polygons:**  the number of lines of symmetry in regular polygons are equal to the number of sides.

EQUILATERAL TRIANGLE : 3 Lines of symmetry

SQUARE : 4 Lines of symmetry

REGULAR PENTAGON : 5 lines of symmetry

REGULAR HEXAGON : 6 lines of symmetry

REGULAR POLYGON WITH n SIDES : n Lines of symmetry

* **Lines of symmetry in English alphabets:**

**Vertical line:** A H I M O T U V W X Y

**Horizontal line:** B C D E H I K O X

**No line of symmetry:** F G J L N P Q R S Z

**Both lines of symmetry:** H I O X

* **LINES OF SYMMETRY IN FIGURES:**

|  |  |  |
| --- | --- | --- |
| **S. NO.** | **NAME OF THE SHAPE** | **NO. OF LINES OF SYMMETRY** |
| 1 | EQUILATERAL TRIANGLE | 3 |
| 2 | SQUARE | 4 |
| 3 | REGULAR PENTAGON | 5 |
| 4 | REGULAR HEXAGON | 6 |
| 5 | ISOSCELES TRIANGLE | 1 |
| 6 | RHOMBUS | 2 |
| 7 | RECTANGLE | 2 |
| 8 | CIRCLE | UNCOUNTABLE |
| 9 | SCALENE TRIANGLE | NO LINE |

**QUESTIONS FOR SELF PRACTICE:**

**LEVEL I**

Q1.Which of the following has both horizontal and vertical lines of symmetry.

1. S b) A c) U d) H

Q2. How many lines of symmetry are there in the following polygons:

1. Square b) rhombus c) Rectangle d) circle

Q3. A parallelogram has………………lines of symmetry. (0, 1, 2, 3)

Q4. Write the capital letters of English alphabet which has no line of symmetry.

Q5. Draw mirror image of the following:

1. E b) D c) L d) P

Q6. Name the triangle which has no line of symmetry.

Q7. Write those English alphabets which has vertical line symmetry. Also draw their line of symmetry.

**LEVEL II**

Q1. Write the letters of the word “ MATHEMATICS” which have horizontal line of symmetry.

Q2. State the number of lines of symmetry for the following figures:

1. Isosceles triangle (ii) Parallelogram (iii) Quadrilateral (iv) a regular hexagon

Q3. Letter D of the English alphabet have reflection symmetry about

1. A vertical mirror ii) a horizontal mirror iii) both (i) and (ii) (iv) none of these

Q4. Find the number of lines of symmetry in the following figure:

i) ii) iii)

Q5. Write the letters of English alphabets having both horizontal and vertical reflection symmetry.

**LEVEL III**

**Q1**. On a squared paper, sketch the following:

1. draw a triangle with a horizontal line of symmetry but no vertical line of symmetry.
2. draw a triangle with a vertical line of symmetry but no horizontal line of symmetry.
3. A quadrilateral with both vertical and horizontal line of symmetry.
4. A hexagon with six lines of symmetry.
5. A hexagon with exactly two lines of symmetry.

Q2. Write all the digits from 0 to 9 and draw their lines of symmetry if exists.

Q3. Find the number of lines of symmetry of the following figures:

i) ii) iii)

Q4. In the figure l is the line of symmetry. Complete the diagram to make it symmetric.

**ACTIVITY:**

1. Students will go around the school and collect some objects having line symmetry.
2. Students will take instruments from their geometry box and find the line of symmetry and reflection symmetry.

**WORKSHEET**

Q1. Write the number of lines of symmetry in circle.

Q2. Does letter “I” has both horizontal and vertical lines of symmetry.

Q3. Find the number of lines of symmetry in scalene triangle.

Q4. Which letter look the same after reflection when the mirror is placed vertically.

1. Z ii) P iii) M iv) N

Q5. How many lines of symmetry are there in isosceles triangle?

Q6. Draw the lines of symmetry in regular pentagon and regular hexagon.

Q7. A regular polygon has four sides. Draw the lines of symmetry for this figure.

Q8. Write the number of lines of symmetry in each letter of the word “SYMMETRY”.

Q9. FILL IN THE BLANKS:

1. The digits having only two lines of symmetry are…………and …………….
2. The digit having only one line of symmetry is………………
3. The number of digits having no line of symmetry………………………
4. The line of symmetry of a line segment is the ……………………..bisector of the line segment.
5. A protractor has …………….. lines of symmetry.
6. The number of lines of symmetry in a regular polygon of n sides is………………….