WONDERLEARNERZ PRIMARY ACADEMY â€" OFFICIAL ANSWER KEY & MARKING SCHEME

Symmetry and Symmetrical Designs: Worksheet 1 [ANSWER KEY]

Grade 5 | Mathematics | Ch 15: Symmetry and Symmetrical Designs | Total Marks: 19 | Time: 45 Minutes

Q1. How many lines of symmetry does a regular square have? [1 Mark]

Correct Answer: 4 lines

Explanation: A square has 4 lines of symmetry: 2 through opposite side midpoints and 2 along diagonals.

Q2. Which of the following capital letters has both a horizontal and a vertical line of symmetry? [1 Mark]

Correct Answer: H

Explanation: The letter 'H' can be folded horizontally and vertically into identical matching halves.

Q3. How many lines of symmetry does an equilateral triangle possess? [1 Mark]

Correct Answer: 3 lines

Explanation: An equilateral triangle has 3 lines of symmetry from each vertex to the midpoint of the opposite side.

Q4. What type of transformation creates a mirror image across a line of symmetry? [1 Mark]

Correct Answer: Reflection

Explanation: Reflection flips a figure across a mirror line to produce a symmetrical image.

Q5. At the City Regional Airport, an artisan creates mosaic tiles. A regular hexagon tile is placed on the floor. How many different lines of symmetry can be drawn across this regular hexagon? [1 Mark]

Correct Answer: 6 lines

Explanation: A regular polygon with n sides has n lines of symmetry. A regular hexagon has 6 lines of symmetry.

Q6. A butterfly design is drawn with its center on a vertical mirror line. If the left wing tip is 14 cm from the mirror line, how far from the mirror line is the right wing tip? [1 Mark]

Correct Answer: 14 cm

Explanation: Line symmetry maintains equal perpendicular distances from the mirror line.

Q7. Which of these capital letters has zero lines of symmetry: M, T, S, or Y? [1 Mark]

Correct Answer: S

Explanation: The letter 'S' has rotational symmetry of order 2, but 0 lines of reflective symmetry.

Q8. Complete the geometric symmetry rule: A regular pentagon has [?] lines of symmetry. [1 Mark]

Correct Answer: 5

Explanation: A regular 5-sided pentagon has 5 lines of symmetry.

Q9. Identify the shape: A circle has [?] lines of symmetry. [1 Mark]

Correct Answer: infinite

Explanation: Any straight line passing through the center of a circle is a line of symmetry, giving infinite lines.

Q10. Chris says: 'Every rectangle has 4 lines of symmetry just like a square.' [1 Mark]

Identify Chris's error and state the correct number of symmetry lines for a non-square rectangle.

Correct Answer: 2 lines of symmetry

Explanation: A standard rectangle's diagonals do not form lines of symmetry. It only has 2 lines of symmetry connecting opposite side midpoints.

Q11. A student claims that the letter 'N' has a line of symmetry down the middle diagonal. Why is this incorrect? [1 Mark]

Correct Answer: Reflecting across the diagonal does not map the vertical stems onto each other (N has rotational, not reflective symmetry)

Explanation: Flipping 'N' across its diagonal inverts the orientations; it has rotational symmetry of 180Â°, not mirror symmetry.

Q12. Explain why an object and its reflected mirror image are congruent even though their orientations are reversed. [2 Marks]

Correct Answer: Reflection preserves all side lengths, perimeter, area, and internal angles unchanged. Because all geometric dimensions match exactly, the shapes are congruent, despite being chiral (mirror) opposites.

Explanation: Isometries preserve distances and angles, ensuring full geometric congruence.

Q13. Why does a circle have infinitely many lines of symmetry while a regular polygon has a finite number? [2 Marks]

Correct Answer: A circle consists of all points equidistant from a single center point. Any diameter drawn at any angle through the center bisects the circle into identical halves.

Explanation: Rotational invariance at all continuous angles yields infinite diameter symmetry axes.

Q14. Point A has coordinates (3, 5). If Point A is reflected across the vertical mirror line x = 6, what are the coordinates of the reflected point A'? [2 Marks]

Correct Answer: (9, 5)

Explanation: Distance from x=3 to line x=6 is 3 units. Moving 3 units past x=6 gives 6 + 3 = 9. The coordinates are (9, 5).

Q15. A symmetrical flag design has a vertical mirror line. If the left side contains 3 blue stars, 2 red stripes, and 1 yellow circle centered on the mirror line, what is the total number of stars and stripes on the full flag? [2 Marks]

Correct Answer: 6 stars and 4 stripes

Explanation: Left: 3 stars + 2 stripes. Right (reflected): 3 stars + 2 stripes. Total = 6 stars and 4 stripes (the circle sits on the line so remains 1).