Patterns in Shapes

A. Choose the Correct Answer:

1. **Which of the following shapes will come next in the pattern: ● ▲ ● ▲ ● ___**
   a) ● b) ▲
   c) ■ d) ◆
2. **If a square is turned 90 degrees clockwise, it will:**
   a) Become a triangle b) Look the same
   c) Become a circle d) Disappear
3. **What kind of symmetry does a regular hexagon have?**
   a) No symmetry b) 3 lines of symmetry
   c) 6 lines of symmetry d) Infinite lines of symmetry
4. **Which pattern continues correctly: △, ▽, △, ▽, △, ___**
   a) △ b) ▽
   c) ◆ d) ◯
5. **Which figure will not fit in the repeating pattern: ◯, ◯, □, ◯, ◯, □, ◯, ◯, □, △?**
   a) □ b) △
   c) ◯ d) None of these

B. Write the Missing Terms to Complete the Sentences:

1. A figure has rotational symmetry if it looks the same after being _____.
2. A pattern that repeats at regular intervals is called a _____ pattern.
3. A _____ has four equal sides and four right angles.
4. The mirror image of a triangle with one vertical line of symmetry is _____.
5. When a figure is flipped over a line, it is called a _____ transformation.

C. Figure out the answers to these questions:

1. **Draw the next two shapes in the pattern: ■, ■■, ■■■, ■■■■, _____, _____**
2. **Identify the rule used in this pattern: ▲, ▲◯, ▲◯◯, ▲◯◯◯, ...**
3. Complete the design by continuing the pattern in the grid (use 3 × 3 dots to show symmetry).
4. Write a short rule to create a pattern using only triangles and squares.

5. **Spot the incorrect shape in the pattern and explain why it doesn't belong: ●, ◯, ●, ◯, ●, ▲**

D. Mark each sentence with a True (✓) or False (✗):

1. All patterns must repeat in exactly the same order.
2. A figure with only one line of symmetry cannot be folded into equal halves in more than one way.
3. Patterns are only found in Mathematics and not in the natural world.
4. Translating a shape means shifting it without rotating or flipping.
5. A pattern can be both repeating and growing at the same time.

E. Challenge yourself with these questions:

1. Observe the following pattern: ◯▲◯▲◯▲. Predict the 10th shape in the sequence.
2. Create a pattern using only stars (*) and hearts (♥) that follows the rule: double the stars each time, one heart remains.
3. Make your own shape pattern using at least three different shapes and write the rule you followed.
4. **Study a pattern made with dots in rows:**

   Row 1: • **Row 2: ••** **Row 3: •••**

   What would Row 6 look like?
5. A shape rotates 45° each time. After how many turns will it return to its original position?
6. Can a pattern be symmetrical and still change in size? Give an example.
7. Describe a real-life object that shows a pattern in its shape (e.g., honeycomb, brick wall).
8. Using graph paper, draw a pattern made of triangles that repeats in both horizontal and vertical directions.