
12. SHAPES AND PATTERNS

TEACHING TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)**Multiple Choice Questions**

1. A shape has both reflectional and rotational symmetry. What could it be?
A) Triangle B) Rectangle C) Circle D) Square

Key: D

Explanation: A square has reflectional symmetry across its diagonals and midlines, and rotational symmetry of order 4.

2. Which shape does NOT have corners?
A) Square B) Triangle C) Circle D) Rectangle

Key: C

Explanation: A circle is a curved shape with no straight edges or corners.

3. Which of the following describes a cylinder?
A) Has two circular bases B) Has four triangular faces
C) Has no edges D) Has eight faces

Key: A

Explanation: A cylinder has two parallel circular bases and a curved surface.

4. In a shape pattern of Triangle, Circle, Triangle, Circle, what comes next?
A) Square B) Triangle C) Circle D) Rectangle

Key: B

Explanation: The pattern alternates: Triangle, Circle, Triangle, Circle, Triangle, so next is Triangle.

5. What type of symmetry does a butterfly exhibit?
A) Rotational Symmetry B) Reflectional Symmetry
C) No Symmetry D) Both Types

Key: B

Explanation: A butterfly shows reflectional symmetry (mirror symmetry) when folded along its body.

6. Which of the following shapes can roll?
A) Cube B) Pyramid C) Sphere D) Rectangle

Key: C

Explanation: A sphere has a curved surface and can roll smoothly.

7. A net for a cube is formed by which of the following shapes?
A) 4 squares B) 6 squares C) 6 rectangles D) 8 triangles

Key: B

Explanation: A cube has 6 faces, so its net consists of 6 squares connected along edges.

8. What is an example of a shape with 4 equal sides?
A) Rectangle B) Rhombus
C) Square D) Parallelogram

Key: C

Explanation: A square has 4 equal sides and 4 right angles.

9. How would you describe the rotation of a shape?
A) Flipping over B) Sliding in a straight line
C) Turning around a fixed point D) Changing size

Key: C

Explanation: Rotation means turning the shape around a fixed center point.

10. Which of the following is NOT a 3D shape?
A) Sphere B) Cube C) Pyramid D) Triangle

Key: D

Explanation: Triangle is a 2D shape; others are 3D.

ADVANCED LEVEL

More than One Answer Type

11. Which of the following are 2D shapes?
A) Triangle B) Cube C) Circle D) Cylinder

Key: A, C

Explanation: Triangle and Circle are flat 2D shapes; Cube and Cylinder are 3D.

12. Identify the shapes that have reflectional symmetry.
A) Square B) Rectangle
C) Hexagon D) Irregular Pentagon

Key: A, B, C

Explanation: Regular hexagon, square, and rectangle have reflectional symmetry; irregular pentagon may not.

13. Which of the following are examples of patterns?
A) 1, 3, 5, 7
B) Red, Green, Blue, Red, Green

- C) Circle, Square, Triangle, Square
D) 2, 4, 6, 8, 10

Key: A, B, D

Explanation: These show repeating or predictable sequences. C is not a clear repeating pattern.

14. What shapes can be represented by a net?
A) Pyramid B) Cone C) Sphere D) Cube

Key: A, B, D

Explanation: Pyramids, cones, and cubes can be unfolded into nets; a sphere cannot.

15. Which of the following statements about rotational symmetry are true?
A) A square has rotational symmetry.
B) A circle has rotational symmetry.
C) A triangle has rotational symmetry.
D) An arrow shape has rotational symmetry.

Key: A, B

Explanation: Square (90° rotations) and circle (any angle) have rotational symmetry; equilateral triangle does, but not all triangles; arrow does not.

Fill In the Blanks

16. A shape has four sides but is not a rectangle. It could be a _____.

Key: trapezium / kite / rhombus

17. When you rotate a square by 180 degrees, it looks _____.

Key: the same / unchanged

18. If you create a pattern of shapes with a sequence: Circle, Triangle, Circle, Triangle, what would be the 7th shape _____.

Key: Circle

19. A shape with five sides is called a _____, but it is not as common as other polygons.

Key: pentagon

20. A cube and a rectangular prism are both examples of _____ shapes.

Key: 3D / polyhedron

Matching Type

21. Match 2D Shapes to Their Definitions

Shapes

1. Circle
2. Square
3. Triangle
4. Rectangle

Definitions

- A. A shape with four equal sides and four right angles.
- B. A shape with three sides and three corners.
- C. A round shape with no corners.
- D. A shape with two pairs of equal sides and four right angles.

Key: 1-C, 2-A, 3-B, 4-D**Answer the Following Questions**

22. What is a net, and how is it related to three-dimensional shapes? Can you describe a net for a cylinder?

Answer: A net is a 2D layout that can be folded to form a 3D shape. A cylinder net has two circles (bases) and one rectangle (curved surface).

23. Identify a number pattern: If the sequence is 5, 10, 15, 20, what would be the next number and why?

Answer: Next number is 25. Pattern: Increase by 5 each time (5, 10, 15, 20, 25).

24. How can you create a color pattern using three colors? Provide an example of a sequence and predict the next color in the pattern.

Answer: Example: Red, Blue, Green, Red, Blue, Green. Next color is Red (repeating sequence).

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Multiple Choice Questions

1. Which of the following is a 2D shape?

- A) Cube B) Sphere C) Rectangle D) Cylinder

Key: C**Explanation:** Rectangle is flat and 2D; others are 3D.

2. What is the number of sides on a triangle?

- A) 2 B) 3 C) 4 D) 5

Key: B**Explanation:** Triangle has 3 sides.

3. Which shape has rotational symmetry at 180 degrees
A) Circle B) Triangle C) Rectangle D) Hexagon

Key: C

Explanation: Rectangle looks the same when rotated 180°.

4. What is the name for a flat pattern that can be folded into a 3D shape?
A) Diagram B) Net C) Model D) Blueprint

Key: B

Explanation: A net is the 2D template for a 3D shape.

5. Which of the following has reflectional symmetry?
A) Star B) Circle C) Parallelogram D) Rectangle

Key: D

Explanation: Rectangle has mirror symmetry; others may not always.

6. How many faces does a cube have?
A) 4 B) 6 C) 8 D) 12

Key: B

Explanation: A cube has 6 square faces.

7. What is an example of a color pattern?
A) Blue, Green, Yellow B) Red, Red, Blue, Red
C) Circle, Square, Triangle D) 1, 2, 3, 4

Key: B

Explanation: It shows a repeating color sequence.

8. If you rotate a square 90 degrees, what shape do you have?
A) Circle B) Triangle C) Square D) Rectangle

Key: C

Explanation: A square looks the same after 90° rotation.

9. What is the area formula for a rectangle?
A) Length + Width B) Length - Width
C) Length × Width D) Length ÷ Width

Key: C

Explanation: Area = Length × Width.

10. Which of the following is an example of a number pattern?
A) 1, 3, 5, 7 B) Circle, Square, Triangle
C) Red, Yellow, Blue D) A, B, C, D

Key: A

Explanation: It shows a sequence increasing by 2.

ADVANCED LEVEL

More than One Answer Type

11. Select the shapes that can be rotated.
A) Rectangle
B) Triangle
C) Circle
D) Hexagon

Key: A, B, C, D

Explanation: All shapes can be rotated; some have symmetry, others do not.

12. Which shapes can be classified as 3D shapes?
A) Ellipse
B) Sphere
C) Triangle
D) Cylinder

Key: B, D

Explanation: Sphere and Cylinder are 3D; Ellipse and Triangle are 2D.

13. Identify the types of patterns present in the following list.
A) Blue, Yellow, Blue, Yellow
B) 5, 10, 15, 20
C) Circle, Circle, Square, Circle
D) A, B, A, B

Key: A, B, D

Explanation: A and D are color/letter patterns; B is a number pattern; C is irregular.

14. Which of the following have rotational symmetry?
A) Star
B) Rectangle
C) Oval
D) Pentagon

Key: B, C

Explanation: Rectangle and oval have rotational symmetry; regular star and pentagon may, but not all.

15. What are some ways to analyze shapes?
A) Visual observation
B) Sound
C) Algebraic calculations
D) Transformational analysis

Key: A, D

Explanation: Shapes are analyzed visually and through transformations like rotation/reflection.

Fill In the Blanks

16. A star shape has _____ symmetry because it looks the same after being rotated by a certain angle.

Key: rotational

17. A _____ shape has length and width but no depth.

Key: 2D / plane

18. A _____ is a three-dimensional shape with two circular bases and a curved surface.

Key: cylinder

19. If a shape can be folded in half and both sides match, it has _____ symmetry.

Key: reflectional

20. A net for a cube consists of _____ squares arranged in a specific pattern.

Key: 6

Matching Type

21. Match Types of Patterns to Their Examples

Types of Patterns

1. Number Pattern
2. Shape Pattern
3. Color Pattern
4. Reflectional Symmetry

Examples

- A. Circle, Square, Circle, Square
- B. 2, 4, 6, 8
- C. A butterfly
- D. Red, Yellow, Red, Yellow

Key: 1-B, 2-A, 3-D, 4-C

Answer the Following Questions

22. What are the two main categories of shapes, and how do they differ?

Answer: Two main categories: 2D (flat, length & width) and 3D (solid, length, width & depth).

23. Can you give an example of a shape that has reflectional symmetry and explain why it has this type of symmetry?

Answer: Example: A square. It has reflectional symmetry because it can be folded along vertical, horizontal, or diagonal lines to match exactly.

24. If you rotate a square 180 degrees around its center, what will its new orientation look like?

Answer: After rotating a square 180° around its center, it looks exactly the same as the original orientation.