



Practice Worksheet on 2D & 3D Shapes in Landscapes

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Subject: Geometry

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Long Answer Questions

1. Explain the difference between linear and rotational symmetry, providing examples of each found in natural and human-made landscapes.
2. Define parallel lines and a transversal line. Describe the angle relationships formed when a transversal intersects parallel lines (vertically opposite, alternate interior, co-interior, corresponding angles).
3. What is the difference between perimeter and area? Provide formulas for calculating the perimeter and area of a rectangle, square, and triangle.
4. Describe how to calculate the area and circumference of a circle. Explain the significance of π (pi).
5. Define a trapezium. Explain how to find the area of a trapezium.
6. Explain how to calculate the area and perimeter of composite two-dimensional

shapes. Provide a step-by-step approach for solving a word problem involving a composite shape.

7. Define surface area and volume. Provide formulas to calculate the surface area and volume of a cube, cuboid, and cylinder.

8. Analyze Stonehenge as a case study, identifying specific geometric principles and shapes used in its construction. Discuss the mathematical challenges involved in its creation.

Multiple Choice Questions

1. What is a transversal line?

- a) A line that intersects two parallel lines at right angles.
- b) A line that intersects two or more lines.
- c) Two lines that never intersect.
- d) Two lines that intersect at a 90-degree angle.

2. What is the area of a shape?

- a) The distance around a 3D shape.
- b) The space inside a 2D shape.
- c) The total length of all sides of a 3D shape.
- d) The distance around a 2D shape.

3. What is a trapezium?

- a) A quadrilateral with two pairs of parallel sides.
- b) A quadrilateral with one pair of parallel sides.
- c) A polygon with five sides.
- d) A polygon with four equal sides.

4. What is the formula for the area of a circle?

- a) πr^2
- b) $2\pi r$
- c) $4\pi r^2$
- d) πr^3

5. What is the surface area of a 3D object?

- a) The amount of space a 2D object occupies.
- b) The total area of all faces of a 3D object.
- c) The distance around a 3D object.
- d) The volume of a 2D object.

6. Which of the following is true about angles formed by a transversal intersecting parallel lines?

- a) Alternate exterior angles are equal.
- b) Co-interior angles add up to 180° .
- c) Corresponding angles are supplementary.
- d) Vertically opposite angles are always acute.

7. How many pairs of parallel sides does a trapezium have?

- a) It has only one pair of parallel sides.
- b) It has one pair of parallel sides.
- c) It has two pairs of parallel sides.
- d) It has no parallel sides.

8. What is the volume of a 3D object?

- a) The amount of space inside a 3D object
- b) The amount of space a 3D object occupies
- c) The total area of all faces of a 3D object
- d) The distance around a 3D object

Answer Key

Long Answer Questions - Expected Responses

1. Explain the difference between linear and rotational symmetry, providing examples of each found in natural and human-made landscapes.

Expected Answer: Linear symmetry involves a mirror image across a line; rotational symmetry involves a shape rotating around a central point and appearing identical multiple times.

2. Define parallel lines and a transversal line. Describe the angle relationships formed when a transversal intersects parallel lines (vertically opposite, alternate interior, co-interior, corresponding angles).

Expected Answer: Parallel lines never intersect; a transversal line intersects them, creating various angle relationships.

3. What is the difference between perimeter and area? Provide formulas for calculating the perimeter and area of a rectangle, square, and triangle.

Expected Answer: Perimeter is the total distance around a 2D shape; area is the space enclosed within the shape.

4. Describe how to calculate the area and circumference of a circle. Explain the significance of π (pi).

Expected Answer: The area of a circle is πr^2 , where 'r' is the radius; the circumference is $2\pi r$.

5. Define a trapezium. Explain how to find the area of a trapezium.

Expected Answer: A trapezium is a quadrilateral with one pair of parallel sides.

6. Explain how to calculate the area and perimeter of composite two-dimensional shapes. Provide a step-by-step approach for solving a word problem involving a

composite shape.

Expected Answer: Composite shapes are made up of multiple basic shapes. Calculate the area of each individual shape and add to find the total area.

7. Define surface area and volume. Provide formulas to calculate the surface area and volume of a cube, cuboid, and cylinder.

Expected Answer: Surface area is the total area of all faces; volume is the amount of space a 3D object occupies.

8. Analyze Stonehenge as a case study, identifying specific geometric principles and shapes used in its construction. Discuss the mathematical challenges involved in its creation.

Expected Answer: Stonehenge demonstrates geometry through its circular layout, precise placement of stones, and the use of angles and circles in its design.

Multiple Choice Questions – Correct Answers

1. What is a transversal line?

Correct Answer: A line that intersects two or more lines.

2. What is the area of a shape?

Correct Answer: The space inside a 2D shape.

3. What is a trapezium?

Correct Answer: A quadrilateral with one pair of parallel sides.

4. What is the formula for the area of a circle?

Correct Answer: πr^2

5. What is the surface area of a 3D object?

Correct Answer: The total area of all faces of a 3D object.

6. Which of the following is true about angles formed by a transversal intersecting parallel lines?

Correct Answer: Co-interior angles add up to 180° .

7. How many pairs of parallel sides does a trapezium have?

Correct Answer: It has one pair of parallel sides.

8. What is the volume of a 3D object?

Correct Answer: The amount of space a 3D object occupies