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

2D Shapes and 3D Objects: Worksheet 4 [ANSWER KEY]

Grade 5 | Mathematics | Ch 12: 2D Shapes and 3D Objects | Total Marks: 19 | Time: 45 Minutes

Q1. How many faces, edges, and vertices does a standard triangular prism have? [1 Mark]

Correct Answer: 5 faces, 9 edges, 6 vertices

Explanation: A triangular prism has 2 triangular bases + 3 rectangular sides = 5 faces, 9 edges, and 6 vertices.

Q2. Which 3D solid has exactly 1 circular base, 1 curved surface, and 1 apex? [1 Mark]

Correct Answer: Cone

Explanation: A cone has 1 flat circular base, 1 curved surface, and 1 pointed apex.

Q3. How many sides does a regular octagon have? [1 Mark]

Correct Answer: 8 sides

Explanation: An octagon has 8 sides and 8 angles.

Q4. What 2D shapes form the net of a square-based pyramid? [1 Mark]

Correct Answer: 1 square and 4 triangles

Explanation: The base is 1 square, surrounded by 4 triangular faces.

Q5. At the Eco-Friendly Solar Park, an architect constructs a geometric installation containing 4 cubes and 3 triangular prisms. How many total flat faces exist across all 7 shapes? [1 Mark]

Correct Answer: 39 faces

Explanation: 4 cubes x 6 faces = 24. 3 triangular prisms x 5 faces = 15. Total = 24 + 15 = 39 flat faces.

Q6. A shipping crate in the shape of a rectangular cuboid has dimensions 5 m long, 3 m wide, and 2 m high. What is the total surface area of all 6 faces? [1 Mark]

Correct Answer: 62 sq m

Explanation: 2 x (5x3 + 5x2 + 3x2) = 2 x (15 + 10 + 6) = 2 x 31 = 62 square meters.

Q7. A student glues together two identical wooden cubes face-to-face to form a single cuboid. How many flat faces does the new cuboid have? [1 Mark]

Correct Answer: 6 faces

Explanation: A cuboid always has 6 flat rectangular faces.

Q8. Solid Shape Riddle: 'I have 6 identical flat square faces, 12 equal edges, and 8 corners.' What shape am I? [1 Mark]

Correct Answer: Cube

Explanation: A cube has 6 identical square faces, 12 edges, and 8 vertices.

Q9. Euler's formula for polyhedra is Faces + Vertices - Edges = [?]. [1 Mark]

Correct Answer: 2

Explanation: Euler's characteristic formula for convex polyhedra is F + V - E = 2.

Q10. Lucas says: 'A cylinder has 2 edges and 2 vertices.' Explain Lucas's error and state the correct number of vertices on a cylinder. [1 Mark]

Correct Answer: A cylinder has 0 vertices

Explanation: The circular edges of a cylinder are smooth loops with no sharp corners (vertices). A cylinder has 0 vertices.

Q11. A student draws a net for a cube with 5 connected squares. Why cannot this net fold into a cube? [1 Mark]

Correct Answer: A cube must have 6 faces

Explanation: A cube requires exactly 6 square faces; a 5-square net leaves one side missing.

Q12. Explain why a sphere cannot be formed by folding a flat sheet of 2D paper without [2 Marks]
cutting, stretching, or wrinkling.
Correct Answer: A sphere has continuous double curvature across its surface, whereas a sheet of paper has zero curvature (flat plane). Flat paper cannot conform to spherical curvature without crumpling.
Explanation: Gaussian curvature of a sphere is positive, while paper is flat (zero curvature).

Q13. Why are triangles considered the most rigid and structurally stable geometric [2 Marks]
shape in engineering bridge trusses?
Correct Answer: A triangle's shape is completely locked by its side lengths. Unlike rectangles, which can deform into parallelograms under load, a triangle cannot change shape without bending or breaking a member.
Explanation: Triangulation provides geometric rigidity because side lengths uniquely fix internal angles.

Q14. Verify Euler's formula (F + V - E = 2) for a pentagonal prism. List its number of [2 Marks]
faces, vertices, and edges.
Correct Answer: F = 7, V = 10, E = 15; 7 + 10 - 15 = 2
Explanation: Faces = 2 pentagons + 5 rectangles = 7. Vertices = 5 + 5 = 10. Edges = 5 + 5 + 5 = 15. 7 + 10 - 15 = 2.

Q15. A wooden cube has a side length of 4 cm. It is painted red on all outer surfaces [2 Marks]
and then cut into 1 cm unit cubes. How many 1 cm cubes have exactly 2 red faces?
Correct Answer: 24 cubes
Explanation: Cubes with 2 painted faces lie along the 12 edges (excluding corners). Each edge has 4 - 2 = 2 such cubes. 12 edges x 2 = 24 cubes.