

Understanding Elementary Shapes — 2D and 3D

Unit: Basic Geometry - Student Practice Worksheet

Overview: Kabir held up a piece of paper and called it a shape. Anaya held up a dice and called it a shape too. Ms. Rao said only one of them could ever lie perfectly flat on a table. The difference between those two kinds of 'shape' turned out to matter a lot.

Practice Questions (30 Total)

Section A - Easy

Q1. The teal square sits flat on the page. 2D or 3D?



flat on the page

- ☐ A. 3D shape
- ☐ B. 2D shape
- ☐ C. Neither 2D nor 3D
- ☐ D. Both 2D and 3D

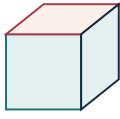
Q2. A flat surface of a 3D shape is called a:

- ☐ A. Face
- ☐ B. Edge
- ☐ C. Vertex
- ☐ D. Net

Q3. How many faces does a cube have?

- ☐ A. 4
- ☐ B. 12
- ☐ C. 8
- ☐ D. 6

Q4. The dice sketch has height. 2D or 3D?



dice has height

- ☐ A. 2D shape
- ☐ B. 3D shape
- ☐ C. Neither 2D nor 3D
- ☐ D. A flat shape

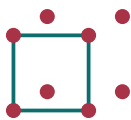
Q5. The line where two faces meet is called a:

- ☐ A. Vertex
- ☐ B. Net
- ☐ C. Edge
- ☐ D. Face

Q6. How many edges does a cube have?

- ☐ A. 6
- ☐ B. 8
- ☐ C. 12
- ☐ D. 10

Q7. Eight maroon corners on the cube. How many vertices?



maroon corners

- ☐ A. 6
- ☐ B. 12
- ☐ C. 10
- ☐ D. 8

Q8. A corner point where edges meet is called a:

- ☐ A. Vertex
- ☐ B. Face
- ☐ C. Net

☐ D. Edge

Q9. A flattened-out pattern that folds into a 3D solid is called a:

☐ A. Face

☐ B. Net

☐ C. Vertex

☐ D. Edge

Q10. Which of sphere, cylinder, triangle, cone is 2D, and why?

☐ A. Sphere

☐ B. Cylinder

☐ C. Triangle

☐ D. Cone

Section B - Medium

Q11. Cube cards: faces, edges, corners. Which triple is 6, 12, 8?



☐ A. 6, 12, 8

☐ B. 8, 12, 6

☐ C. 6, 8, 12

☐ D. 4, 6, 8

Q12. Why does a 2D shape have no volume?

☐ A. Because it is always too small

☐ B. Because it has too many sides

☐ C. Because it is always a circle

☐ D. Because it has no thickness — only length and width

Q13. A rectangular box (cuboid) has how many faces?

☐ A. 4

☐ B. 6

☐ C. 8

☐ D. 12

Q14. A triangular pyramid: 4 faces, 4 corners. How many edges?



4 faces, 4 corners

☐ A. 4

☐ B. 6

☐ C. 8

☐ D. 12

Q15. Why is a cylinder tricky to describe using 'faces, edges, vertices' the same way as a cube?

☐ A. It has curved surfaces, not just flat faces meeting at straight edges

☐ B. It has no surfaces at all

☐ C. It is actually a 2D shape

☐ D. It has more vertices than a cube

Q16. A cuboid has how many edges?

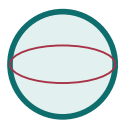
☐ A. 6

☐ B. 8

☐ C. 12

☐ D. 10

Q17. A ball with no flat sides. How many flat faces?



no flat faces

☐ A. 1

☐ B. 6

☐ C. 0

☐ D. 2

Q18. Can more than one valid net exist for the same 3D solid?

- ☐ A. No, every solid has exactly one possible net
- ☐ B. Only spheres can have multiple nets
- ☐ C. Only cubes can have zero nets
- ☐ D. Yes, as long as folding recreates the same faces meeting correctly

Q19. Which pair correctly matches a real object to its dimension type?

- ☐ A. A drawn circle = 2D; a football = 3D
- ☐ B. A drawn circle = 3D; a football = 2D
- ☐ C. Both are 2D
- ☐ D. Both are 3D

Q20. A cross of six squares folded to a cube. What does that confirm about nets?

- ☐ A. The specific arrangement of faces in a net doesn't have to match Ms. Rao's example exactly, as long as folding still works
- ☐ B. Only cross-shaped nets ever work for cubes
- ☐ C. The cube must have been drawn incorrectly
- ☐ D. Nets never actually fold into real solids

Section C - Challenge

Q21. Cube numbers 6, 8, 12 in $F+V-E$. What does $6+8-12$ equal?

$$6 + 8 - 12$$

cube F, V, E

- ☐ A. $6+8-12=2$, confirming the formula
- ☐ B. $6+8-12=4$, formula fails
- ☐ C. $6+8-12=0$, formula fails
- ☐ D. The formula cannot be checked this way

Q22. Kabir claims a cylinder has exactly 2 faces (top and bottom circles) and 0 edges. Is the 'edges' part correct under a strict flat-face definition?

- ☐ A. It's debatable, depending on the definition used
- ☐ B. Yes, cylinders definitely have zero edges under every definition
- ☐ C. No, cylinders have exactly 12 edges like a cube
- ☐ D. No, cylinders have no faces at all

Q23. Using Euler's formula ($F+V-E=2$), a solid has 5 faces and 6 vertices. How many edges must it have?

- ☐ A. 9
- ☐ B. 11
- ☐ C. 13
- ☐ D. 7

Q24. The net is made of triangles for a triangular pyramid. How many triangles?



- ☐ A. 3
- ☐ B. 4
- ☐ C. 6
- ☐ D. 8

Q25. Why can't a single flat net ever be folded into a sphere, unlike a cube?

- ☐ A. Spheres are actually 2D shapes
- ☐ B. Spheres have too many vertices
- ☐ C. Its surface is continuously curved, unlike flat cube faces
- ☐ D. Spheres have no surface at all

Q26. A triangular prism has 2 triangular faces and 3 rectangular faces (5 total), and 9 edges. How many vertices does it have?

- ☐ A. 8
- ☐ B. 6
- ☐ C. 5
- ☐ D. 9

Q27. Teal cube and maroon cuboid boxes. Does the face count change?



- ☐ A. Yes, a cube always has more faces than a cuboid

- ☐ **B.** Yes, a cube always has fewer faces
- ☐ **C.** Cubes and cuboids cannot be compared this way
- ☐ **D.** No — both a cuboid and a cube have exactly 6 faces, just cubes have all-equal squares

Q28. Why is understanding 2D and 3D shapes useful beyond just naming them?

- ☐ **A.** It has no real practical use beyond naming shapes
- ☐ **B.** Only artists need this distinction
- ☐ **C.** 2D and 3D shapes are identical in every practical sense
- ☐ **D.** Area, volume, packaging and construction all depend on it

Q29. A solid has 8 faces, 12 vertices, and (by Euler's formula) how many edges?

- ☐ **A.** 20
- ☐ **B.** 16
- ☐ **C.** 18
- ☐ **D.** 22

Q30. Not every 3D shape is only flat faces. What manufacturing consequence?

- ☐ **A.** Curved objects need different manufacturing than flat-faced boxes
- ☐ **B.** Curved 3D objects cannot actually be manufactured
- ☐ **C.** It has no practical consequence at all
- ☐ **D.** Curved objects are always more expensive regardless of shape

Answer Key

Q1: (B) (b) 2D shape — flat, length and width only.

Q2: (A) (a) Face.

Q3: (D) (d) 6 faces.

Q4: (B) (b) 3D shape — has length, width and height.

Q5: (C) (c) Edge.

Q6: (C) (c) 12 edges.

Q7: (D) (d) 8 vertices.

Q8: (A) (a) Vertex.

Q9: (B) (b) Net.

Q10: (C) (c) Triangle — flat, no thickness.

Q11: (A) (a) 6 faces, 12 edges, 8 vertices.

Q12: (D) (d) A 2D shape has no thickness, so there's no third dimension to give it volume.

Q13: (B) (b) 6 faces, same as a cube — top, bottom, and four sides.

Q14: (B) (b) 6 edges — each of the 4 triangular faces shares an edge with the others.

Q15: (A) (a) A cylinder's curved surface doesn't fit the flat-face, straight-edge, sharp-vertex description as neatly as a cube.

Q16: (C) (c) 12 edges, same as a cube.

Q17: (C) (c) 0 — a sphere's entire surface is curved, with no flat faces at all.

Q18: (D) (d) Yes — different arrangements of the same faces can fold into the identical solid.

Q19: (A) (a) A drawn circle is flat (2D); a real football is solid and takes up space (3D).

Q20: (A) (a) It confirms multiple different net layouts can all fold into the same correct solid.

Q21: (A) (a) $6+8-12=2$ — matches Euler's formula exactly.

Q22: (A) (a) It genuinely depends on the definition used — some treat the circular boundary where the curved surface meets each flat face as an edge, others reserve 'edge' for meetings of two flat faces only.

Q23: (A) (a) $5+6-E=2$, so $E=9$.

Q24: (B) (b) 4 — one flat triangle for each of the pyramid's 4 triangular faces.

Q25: (C) (c) A sphere's continuously curved surface cannot be represented by flat pieces folded together without stretching or distorting — genuinely different from a flat-faced solid like a cube.

Q26: (B) (b) 6. Using Euler's formula: $5+V-9=2$, so $V=6$.

Q27: (D) (d) No — a cube is simply a special cuboid where all faces happen to be equal squares; both have 6 faces.

Q28: (D) (d) Real applications like packaging, construction, and area/volume calculations all depend on correctly distinguishing flat 2D measurements from solid 3D ones.

Q29: (C) (c) 18. $8+12-E=2$, so $E=18$.

Q30: (A) (a) Curved-surface objects (bottles, balls, cylinders) genuinely require different manufacturing and design techniques than flat-faced boxes, since they can't be built from a simple flat-folding net.

You've got this! Keep learning and shining! - Ruchi Math Coaching