

## Three-Dimensional Shapes

Solids have three dimensions: length, width, and height. Each solid has faces (flat sides), edges (where faces meet), and vertices (corners). Count them carefully.


Solid	Faces	Edges	Vertices
Cube	6	12	8
Rectangular prism	6	12	8
Triangular prism	5	9	6
Cylinder	2 flat + 1 curved	2 circular	0
Cone	1 flat + 1 curved	1 circular	1
Sphere	0 flat	0	0

### Key Concepts

- Faces** are the flat surfaces. **Edges** are the line segments where two faces meet. **Vertices** are the corners where edges meet.
- A **cube** has 6 square faces, 12 edges, and 8 vertices.
- A **cylinder** has 2 circular flat faces and 1 curved surface. Like a soup can.
- A **sphere** has *no* flat faces, no edges, and no vertices. It's perfectly round.


### Worked Examples

① How many faces does a cube have?

 A cube has a top, bottom, and four side faces. Total: 6.

 **Answer:** 6

② A shape has 2 flat circles and 1 curved surface. What is it?

 Two flat circular faces and a curved side describes a cylinder. (Like a soup can.)

 **Answer:** *Cylinder*

③ How many vertices does a cone have?

 A cone has 1 pointed tip (the apex) and a circular base. The tip is the only vertex.

 **Answer:** 1




### Practice Problems

Count faces, edges, vertices, or name the solid.

- Cube: faces = ? \_\_\_\_\_
- Cube: edges = ? \_\_\_\_\_
- Cube: vertices = ? \_\_\_\_\_
- Rectangular prism: faces = ? \_\_\_\_\_
- Cone: vertices = ? \_\_\_\_\_
- Sphere: faces = ? \_\_\_\_\_

7. Cylinder: flat faces = ? \_\_\_\_\_
8. Triangular prism: faces = ? \_\_\_\_\_
9. A ball is a \_\_\_\_\_. \_\_\_\_\_
10. A cereal box is a \_\_\_\_\_. \_\_\_\_\_
11. A party hat is a \_\_\_\_\_. \_\_\_\_\_
12. A soup can is a \_\_\_\_\_. \_\_\_\_\_

**Study Tips**

-  For a prism, the number of vertices is double the number of corners of its base. A triangular prism has  $3 + 3 = 6$  vertices.
-  Curved surfaces don't count as "faces" the same way flat ones do. A cylinder has 2 flat faces; the curved side is separate.
-  Spheres have NONE of any: no flat faces, no edges, no vertices.

**Word Problems**

1. Ben stacks 3 cubes. How many total faces do the 3 cubes have (before stacking)?

Answer: \_\_\_\_\_

2. A gift box shaped like a rectangular prism has 12 edges. A soup can has 2 edges. How many more edges does the box have?

Answer: \_\_\_\_\_

**Answer Key — with Friendly Explanations****Practice Problems**

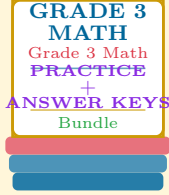
1. Cube has 6 flat square faces.  
 **Answer:** 6
2. 12 edges (where faces meet).  
 **Answer:** 12
3. 8 vertices (corners).  
 **Answer:** 8
4. Same as a cube: 6.  
 **Answer:** 6
5. One vertex at the tip.  
 **Answer:** 1
6. No flat faces.  
 **Answer:** 0
7. Two circular flat faces.  
 **Answer:** 2
8. 2 triangular ends + 3 rectangular sides = 5.  
 **Answer:** 5
9. Sphere.  
 **Answer:** *Sphere*
10. Rectangular prism.  
 **Answer:** *Rectangular prism*
11. Cone.  
 **Answer:** *Cone*
12. Cylinder.  
 **Answer:** *Cylinder*

**Word Problems**

1.  $3 \times 6 = 18$  faces.  
 **Answer:** 18 faces
2.  $12 - 2 = 10$  more edges.  
 **Answer:** 10 more edges

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