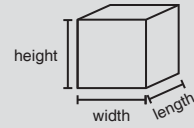
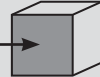


“3D” stands for “three-dimensional.” 3D objects take up space in three dimensions. We often call these three dimensions **length**, **width**, and **height**.

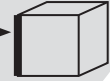


Geometric solids are three-dimensional shapes that take up space.

A flat side of a geometric solid is called a **face**.



A line segment where the faces of a solid meet is called an **edge**.



A point where edges meet is called a **vertex**.



A geometric solid with no curved surfaces whose faces are all polygons is called a **polyhedron**.

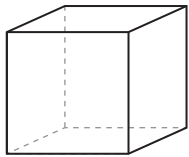
The plural of vertex is **vertices**.
The plural of polyhedron is **polyhedra** or **polyhedrons**.

When we draw 3D objects on paper, we often use dashed lines to show hidden edges.



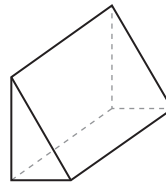
PRACTICE | Answer each question below.

7. How many faces, edges, and vertices does this polyhedron have?



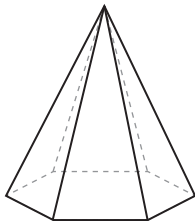
Faces: _____
Edges: _____
Vertices: _____

8. How many faces, edges, and vertices does this polyhedron have?



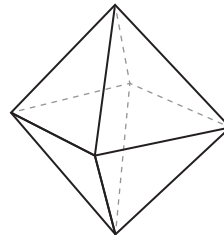
Faces: _____
Edges: _____
Vertices: _____

9. How many faces, edges, and vertices does this polyhedron have?



Faces: _____
Edges: _____
Vertices: _____

10. How many faces, edges, and vertices does this polyhedron have?



Faces: _____
Edges: _____
Vertices: _____

11. ★ Four equilateral triangles are attached to create a polyhedron with four faces. How many edges and vertices does the polyhedron have?

11. Edges: _____
Vertices: _____

A **prism** is a polyhedron with two congruent faces that are parallel.

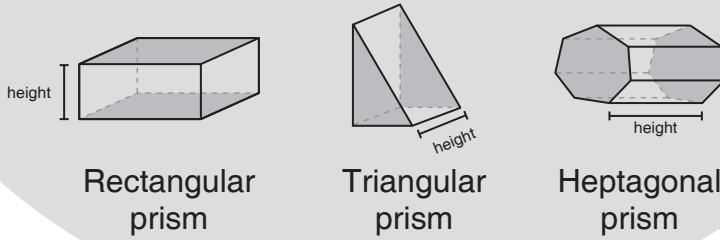
The congruent faces are called the **bases** of the prism.

We name the prism by the shape of its bases.

The bases of a prism are connected by parallelograms.

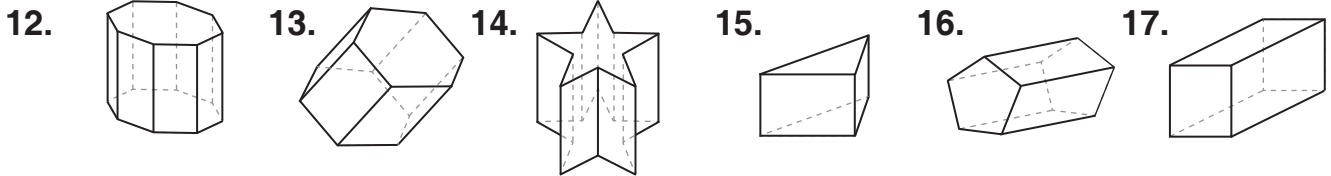
The **height** of a prism is the distance between its bases.

The faces that connect the bases of a prism are its **lateral faces**.
All of the prisms in this chapter are called **right** prisms and have lateral faces that are rectangles.



PRACTICE

Shade the bases of each prism below. Then, draw a line to connect each prism to its name.



- Triangular prism
- Rectangular prism
- Pentagonal prism
- Hexagonal prism
- Octagonal prism
- Decagonal prism

18. Write the number of faces, edges, and vertices of each prism in the table below.

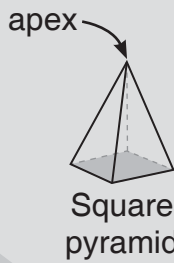
<i>Prism</i>	<i>Faces</i>	<i>Edges</i>	<i>Vertices</i>
Triangular Prism			
Rectangular Prism			
Pentagonal Prism			
Hexagonal Prism			
Octagonal Prism			
Decagonal Prism			

19. A nonagon is a polygon with 9 sides. How many faces, edges, and vertices does a nonagonal prism have?

19. Faces: _____
Edges: _____
Vertices: _____

A **pyramid** is a polyhedron that has one polygon as a base. All other faces of the pyramid are triangles that meet at a single vertex called the pyramid's **apex**.

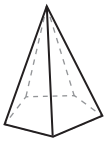
Like a prism, a pyramid is named by the shape of its base.



PRACTICE

Shade the base of each pyramid below. Then, draw a line to connect each pyramid to its name.

20.



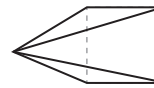
21.



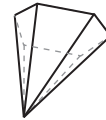
22.



23.



24.



Triangular pyramid

Square pyramid

Pentagonal pyramid

Hexagonal pyramid

Octagonal pyramid

25. Write the number of faces, edges, and vertices of each pyramid in the table below.

Pyramid	Faces	Edges	Vertices
Triangular Pyramid			
Square Pyramid			
Pentagonal Pyramid			
Hexagonal Pyramid			
Octagonal Pyramid			

26. A heptagon is a polygon with 7 sides. How many faces, edges, and vertices does a heptagonal pyramid have?

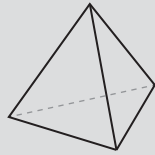
26. Faces: _____

Edges: _____

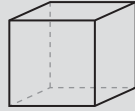
Vertices: _____

27. An icosagon is a polygon with 20 sides. How many **more** edges does an icosagonal prism have than an icosagonal pyramid?

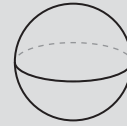
27. _____



A **regular tetrahedron** is a special type of pyramid whose four faces are equilateral triangles.



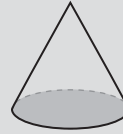
A **cube** is a special type of rectangular prism in which all six faces are squares.



A **sphere** is a round 3D object, like a ball.



A **cylinder** is like a prism, but with circles as its bases.

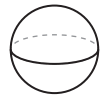


A **cone** is like a pyramid, but with a circle as its base.

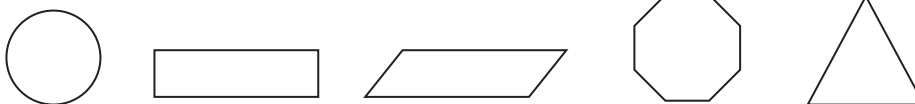
PRACTICE | Answer each question below.

28. Which solids at the top of this page are polyhedra? Which are not? Explain. (You can review the definition of a polyhedron on page 8.)

29. A solid rubber sphere is cut into two pieces with one straight cut. What is the shape of the new flat sides of both pieces? Does it matter where the sphere is cut?



30. Phyllis splits a **cylinder** of cake into two pieces with one straight cut. Circle all of the shapes below that could be the flat sides of both new pieces.



31. James splits a **cone** of cake into two pieces with one straight cut. Circle all of the shapes below that could be the flat sides of both new pieces.

