Understanding Math

Southern Nevada
Regional Professional Development Program


This edition of *Understanding Math* is based on a recent question to RPDP from a teacher. The teacher asks, "What is a right circular cylinder? Wouldn't all cylinders be 'right'?" The short answer to that question is, "No."

First, let's review a basic definition of a cylinder. *A **cylinder** is a solid composed of two parallel and congruent bases that are simple closed curves and a lateral curved surface joining them.* (Actually, the true mathematical definition is much more precise—and complex. We'll save that for another time.) So, the cylinder shown at right has two circular bases and a lateral curved surface. A *net* of the cylinder is provided for reference.
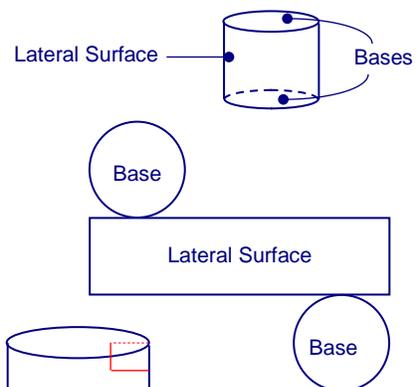
What makes a cylinder "right?" Does that mean it's not "left?" Or is it correctly drawn? Neither. A *right* cylinder is one in which the bases are perpendicular to the lateral surface. The given example is a right cylinder—its bases are at right angles to the lateral surface.
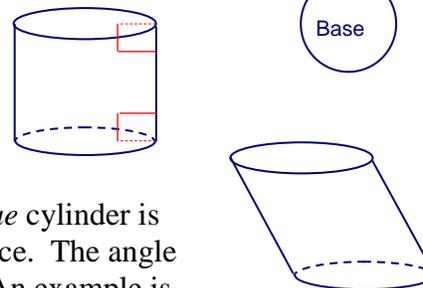
Can a cylinder not be *right*? Yes, when it's *oblique*. An *oblique* cylinder is one in which the bases are *not* perpendicular to the lateral surface. The angle between the bases and the lateral surface are not right angles. An example is shown at right.

Obliqueness is not limited to cylinders. Prisms can be oblique or right, as well. A prism is "right" if the lateral *faces* are at right angles to the two congruent bases, which are polygons. The faces of a right prism are rectangular; the faces of an oblique prism are non-rectangular parallelograms.
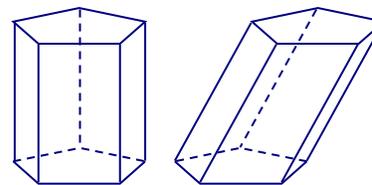
Let's review the teacher's questions. "What is a right circular cylinder? Wouldn't all cylinders be 'right'?" We've addressed the issue of "right." Another interesting question that one could ask is, "Wouldn't all cylinders be 'circular'?" Again, the short answer is, "No."

Remember, a cylinder is a solid composed of two parallel and congruent *bases that are simple closed curves* and a lateral curved surface joining them. Simple closed curves? Like this? Why not? Make two parallel bases from that shape and include a curved surface joining them.

A 'circular' cylinder has bases that are congruent circles. One could easily make an 'oval' cylinder or even a 'bean-shaped' cylinder like the one shown. We could even make it oblique