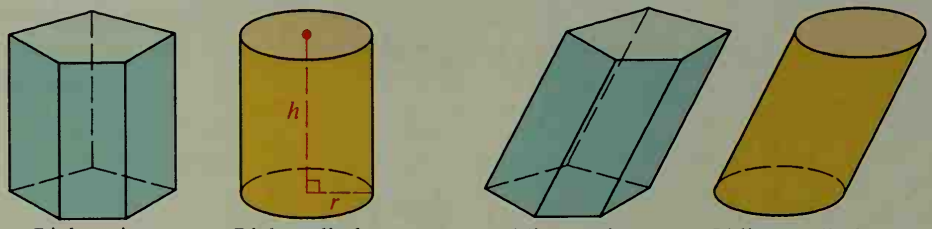
12-3 *Cylinders and Cones*

A **cylinder** is like a prism except that its bases are circles instead of polygons. In a **right cylinder,** the segment joining the centers of the circular bases is an **altitude.** The length of an altitude is called the *height*, h, of the cylinder. A radius of a base is also called a **radius,** r, of the cylinder.



Right prism Right cylinder Oblique prism Oblique cylinder

The diagrams above show the relationship between prisms and cylinders. In the discussion and exercises that follow, the word "cylinder" will always refer to a right cylinder.

It is not surprising that the formulas for cylinders are related to those for prisms: L.A. $= ph$ and $V = Bh$. Since the base of a cylinder is a circle, we substitute $2\pi r$ for p and πr^2 for B and get the following formulas.

Theorem 12-5

The lateral area of a cylinder equals the circumference of a base times the height of the cylinder. (L.A. $= 2\pi rh$)

Theorem 12-6

The volume of a cylinder equals the area of a base times the height of the cylinder. ($V = \pi r^2 h$)

A **cone** is like a pyramid except that its base is a circle instead of a polygon. The relationship between pyramids and cones is shown in the diagrams below.

Regular pyramid Right cone Oblique pyramid Oblique cone

Note that "slant height" applies only to a regular pyramid and a right cone. We will use the word "cone" to refer to a right cone.