

Geometry Info Sheet #53

Cones

Definitions

- Cone:** A geometric solid with a flat circular **base** and a curved **lateral surface** that connects the base to a point not in the plane of the base (the **vertex** or apex)
- Altitude:** The perpendicular segment from the vertex of a cone to the plane of its base
- Height:** The length of the altitude of a cone
- Axis:** For a cone, the segment connecting the vertex to the center of the base
- Slant Height:** For a right cone, the distance from the vertex to any point along the circular base
- Right Cone:** A cone in which the altitude intersects the base at its center; the vertex lies directly above the center of the base
- Oblique Cone:** A cone in which the vertex does not lie directly above the center of the base

As is the case with cylinders, since cones contain curved surfaces, they are not polyhedrons. Cones can also have elliptical bases, but for purposes of this Info Sheet, circular bases will be assumed.

Formulas

The **lateral area** L of a **right circular cone** with base perimeter p and slant height ℓ is given by:

$$L = \frac{1}{2}p\ell \quad \text{or} \quad L = \pi r\ell$$

The **surface area** S of a **right circular cone** with

base area B , lateral area L , radius r , and slant height ℓ is given by: $S = B + L$ or $S = \pi r^2 + \pi r\ell$

The **volume** V of **any circular cone** with

base area B , radius r , and height h is given by:

$$V = \frac{1}{3}Bh \quad \text{or} \quad V = \frac{1}{3}\pi r^2h$$