Geometry Info Sheet #54

Spheres

Definitions

Sphere: A geometric solid consisting of the set of all points in space equidistant from a given point (the **center**)

Radius: A line segment from the center of a sphere to a point on the sphere

Chord: A line segment whose endpoints are on a sphere

Diameter: A chord that contains the center of a sphere

Great Circle: A circle formed by the intersection of a sphere with any plane that passes through the center of the sphere

Circumference: For a sphere, the perimeter (circumference) of a great circle

Hemisphere: Half of a sphere; a great circle divides a sphere into two hemispheres

Additional Sphere Information

If a plane and a sphere intersect at more than one point, then their intersection is a circle.

The shortest path between two points on a sphere is the arc of a great circle.

Of all the geometric solids with a given surface area, a sphere has the greatest volume; of all the geometric solids with a given volume, a sphere has the smallest surface area.

Formulas

The **surface area** S of a **hemisphere** (including the base) with radius r is given by: $S = 3\pi r^2$

The **surface area** S of a **sphere** with radius r is given by: $S = 4\pi r^2$

The **volume** V of **sphere** with radius r is given by: $V = \frac{4}{3}\pi r^3$