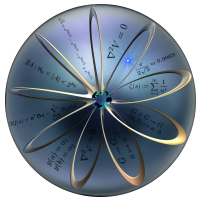

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area of spherical calotte by means of chord

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Let the arc PR of a circle with radius r rotate about the diameter PQ. The surface of revolution is a spherical calotte with the height h. If the of the chord PR is k, we obtain from the right triangle PQR the proportion equation

$$\frac{h}{k} = \frac{k}{2r},$$

i.e. the chord k is the central proportional of the height and the diameter. Accordingly, we can substitute $2rh = k^2$ to the expression

$$A = 2\pi rh$$

of the area of the spherical calotte derived in the `http://planetmath.org/AreaOfSphericalZonep` entry. Thus we have an alternative

$$A = \pi k^2 \tag{1}$$

for finding the area of a spherical calotte.

References

[1] K. Väisälä: *Geometria*. Kymmenennen painoksen muuttamaton lisäpainos. Werner Söderström Osakeyhtiö, Porvoo & Helsinki (1971).