



Acc. Geometry B/Algebra II Unit 1

Circles & Volume

References

Textbook Connection:
HMH Analytic Geometry:
Unit 3 Modules 11-12

HMH Digital Textbook
<http://my.hrw.com>

Helpful Links:

- Lesson on angles:
<http://www.brightstorm.com/math/geometry/circles/inscribed-angles/>
- Lesson on segments:
<https://mathbitsnotebook.com/Geometry/Circles/CRSegmentRules.html>
- Lesson on Constructions:
<http://www.math.nmsu.edu/~pmorandi/CourseMaterials/InscribedTriangles.html>
- Lesson on Constructions:
<http://www.mathopenref.com/consttangents.html>
- Lesson on Volume:
<http://www.mathexpression.com/volume-formulas.html>
- http://cms.gavirtualschool.org/Shared/Math/GSEGeometries17/GSEGeometry_CirclesandVolumePart1_Shared/index.html
- http://cms.gavirtualschool.org/Shared/Math/GSEGeometries17/GSEGeometry_CirclesandVolumePart2_Shared/index.html

Dear Parents

In this unit, students will explore and understand parts of a circle and their relationship to each other. Students will formalize an understanding of the development of volume formulas and use them at an application level.

Concepts Students will Use & Understand

- Understand and apply theorems about circles.
- Construct the inscribed & circumscribed circles of a triangle and prove properties of angles for a quadrilateral inscribed in a circle.
- Construct a tangent line from a point outside a given circle to the circle.
- Find arc lengths and areas of sectors of circles.
- Explain volume formulas and use them to solve problems

Vocabulary

Central Angle: an angle whose vertex is at the center of a circle

Chord: a segment whose endpoints are on a circle

Circumcenter: The point of intersection of the perpendicular bisectors of the sides of a given triangle; the center of the circle circumscribed about a given triangle

Circumscribed Circle: a circle containing an inscribed polygon; for this unit the polygon will be a triangle and so the center of the circle will be the circumcenter of the triangle

Inscribed: an inscribed planar shape or solid is one that is enclosed by and "fits snugly" inside another geometric shape or solid

Inscribed Angle: an angle whose vertex is on the circle and whose sides contain chords of a circle

Inscribed Circle: a circle enclosed in a polygon, where every side of the polygon is a tangent to the circle; specifically for this unit the polygon will be a triangle and so the center of the Inscribed Circle is the incenter of the triangle

Inscribed Polygon: a polygon whose vertices all lie on a circle

Point of Tangency: the point where a tangent line touches a circle

Secant Line: a line in the plane of a circle that intersects a circle at exactly two points

Secant Segment: a segment that contains a chord of a circle and has exactly one endpoint outside of the circle

Tangent Line: a line in the plane of a circle that intersects a circle at only one point, the point of tangency

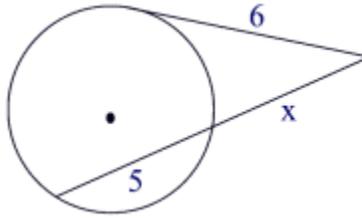
Cavalieri's Principle: a method, with formula given below, of finding the volume of any solid for which cross-sections by parallel planes have equal areas; this includes, but is not limited to, cylinders and prisms

Try <http://intermath.coe.uga.edu/dictionary/homepg.asp> or <http://www.amathsdictionaryforkids.com/> for further examples.

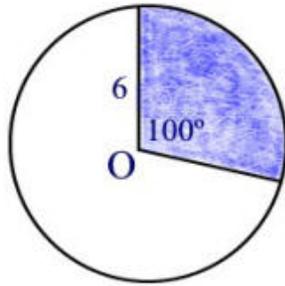
Sample Practice Problems

Example 1

Solve for x :



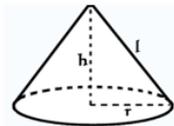
Example 2



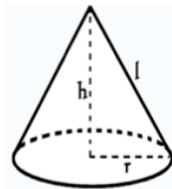
Find the area of the shaded **sector** of circle O. The radius is 6 inches and the central angle is 100° . Express answer to the *nearest tenth of a square inch*.

Example 3

The two cones have the same radius. How much greater is the volume of the taller cone than the shorter cone?



$r = 8 \text{ in}$
 $h = 12 \text{ in}$



$r = 8 \text{ in}$
 $h = 19 \text{ in}$

Key

Example 1: $x=4$

Example 2: Find fractional portion of the circle by using $100/360$. Area sector = $100/360(\pi)(6^2)$. Area of the sector is 31.4 in.^2

Example 3: The larger cone is approximately 469.14 cubic inches greater in volume.