Geometry Unit 4
Circles & Volume

References

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

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

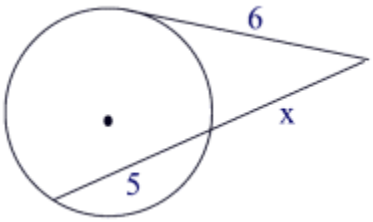
Central Angle: an angle whose vertex is at the center of a circle
Chord: a segment whose endpoints are on a circle
Circumcenter: The point of intersection of the perpendicular bisectors of the sides of a given triangle; the center of the circle circumscribed about a given triangle
Circumscribed Circle: 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/dictnary/homepg.asp or http://www.amathsdictionaryforkids.com/ for further examples.

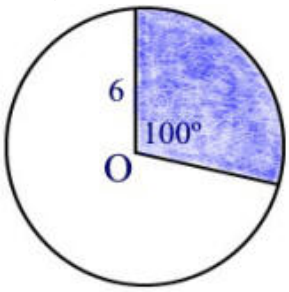
Sample Practice Problems

Example 1

Solve for x:



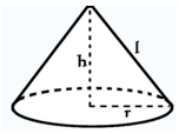
Example 2



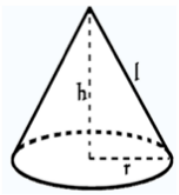
Find the area of the shaded **sector** of circle O. The radius is 6 inches and the central angle is 100°. Express answer to the *nearest tenth of a square inch.*

Example 3

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



r = 8in
h = 12in



r = 8 in
h = 19in

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.