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

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?

**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.