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### U13 CW #1 *Applying Radicals - Volume of Cylinders, Cones, and Spheres*

In this lesson we will finding the Volume of various 3D shapes. We will practice using the skills we have learned so far this year, including working with exponents and radicals, to find the volume. We will also learn the formulas that we need to know as we find the Volume of Cylinders, Cones and Spheres. We should recall that the formula *V=Bh I what you use to* find the volume of a 3D shape, where *B represents the Area of the base, and h represents the height*. We use the formula A=πr2  to find *B*.

A cylinder is a solid obtained by taking a circle in a plane (called the base) and drawing it out in a direction perpendicular to the base for a distance *h* (called the height). The picture below describes how to find the volume of a Cylinder. Describe each part of the formula and how it relates to the formula .

***r***

***h***

**Directions:** Find the volume for each cylinder described. *If needed draw and label a picture*.

|  |  |
| --- | --- |
| 1. Cylinder with a Radius = 21 mm and a   Height = 19 mm. | 1. Cylinder with a Diameter = 8.8 cm and a   Height = 9 cm. |
| 1. A cylindrical well has a radius of 10 feet and a height of 15 feet. What volume of water will it take to fill in the well? | 1. Many villages have water tanks that they use for farming. Jeff’s village has a cylinder shaped water tank that has a 4 m radius and a 9 m height. Find the volume of the cylinder. |

### Volume of Cones

A cone is a three-dimensional figure with a circular base. A curved surface connects the base and the vertex. The cylinder and cone given below have the same height and their bases are congruent. We use the formula to find the volume of a come.



**Directions:** Find the volume for each cone described. If needed draw and label a picture.

|  |  |
| --- | --- |
| 1. A cone with a radius of 8.4 feet and a height of 5.5 feet. | 1. A cone with a diameter of 9 meters and a height of 4.2 meters. |
| 1. Salt and sand mixtures are often used on icy roads. When the mixture is dumped from a truck into the staging area, it forms a cone-shaped mound with a diameter of 10 feet and a height of 6 feet. What is the volume of the salt-sand mixture? | 1. For Anya's birthday her father gave out colorful birthday hats that were cone shaped. Anya was very happy that day. The opening of the bottom of the hat was 3 cm and the height of the cone was 7 cm. Anya fills her hat with candy. What is the approximate volume of candy? |

### Volume of Spheres

Recall that a sphere is a set of points in space that are a distance of *r* away from a point *C*, the center of the sphere. The cylinder and hemisphere given below have the same radius and the height of the cylinder is also the same as its radius. We use the formula to find the volume of a sphere. The hemisphere would be half of the Volume of the sphere (divide the formula by 2).





*C*

*C*

*= h*

**Directions:** Find the volume for each sphere described. If needed draw and label a picture.

|  |  |
| --- | --- |
| 1. A sphere with a radius of 1.3 yds. | 1. A sphere with a diameter of 25 inches |
| 1. A baseball has a 45 cm diameter. What is the volume of the contents of the ball? | 1. Find the volume of a sphere whose r is 20 inches? |