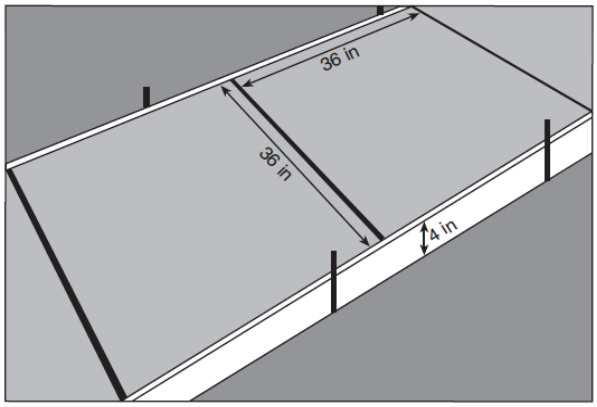
Name: _____ **Date: _____**
CC Geometry Honors

Volume Regents Practice

1. A candle maker uses a mold to make candles like the one shown below.

The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

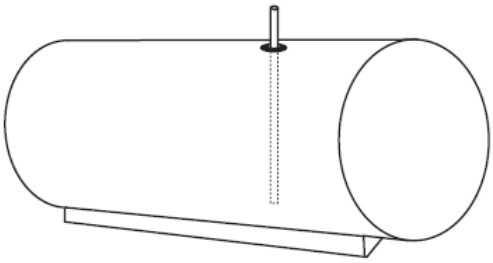
2. Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



How much money will it cost Ian to replace the two concrete sections?

3. A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the *nearest gram*, the total mass of the chocolate in the box.

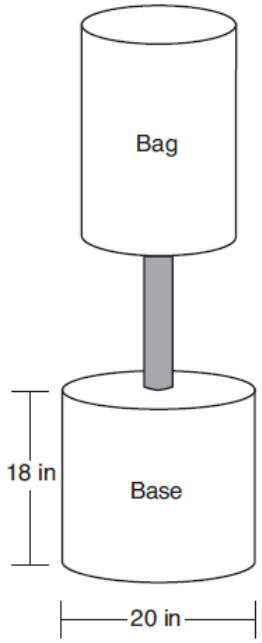
4. A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

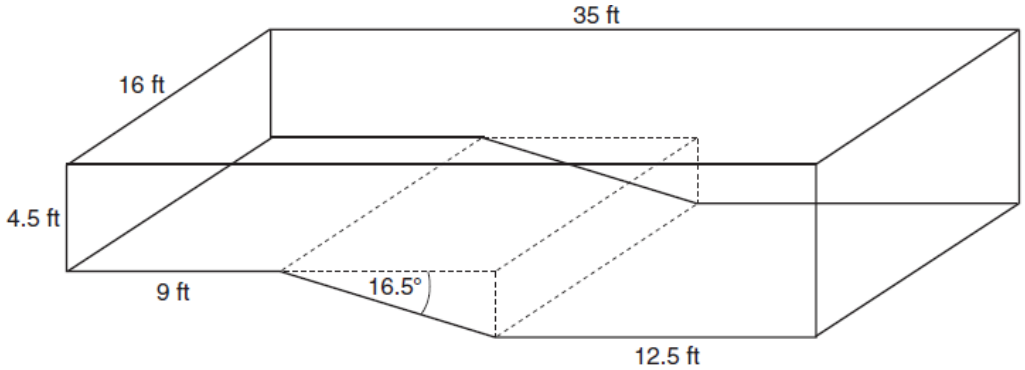
5. Trees that are cut down and stripped of their branches for timber are approximately cylindrical. A timber company specializes in a certain type of tree that has a typical diameter of 50 cm and a typical height of about 10 meters. The density of the wood is 380 kilograms per cubic meter, and the wood can be sold by mass at a rate of $4.75 per kilogram. Determine and state the minimum number of whole trees that must be sold to raise at least $50,000.

6. Shae has recently begun kickboxing and purchased training equipment as modeled in the diagram below. The total weight of the bag, pole, and unfilled base is 270 pounds. The cylindrical base is 18 inches tall with a diameter of 20 inches. The dry sand used to fill the base weighs 95.46 lbs per cubic foot.



To the *nearest pound*, determine and state the total weight of the training equipment if the base is filled to 85% of its capacity.

7. A rectangular in-ground pool is modeled by the prism below. The inside of the pool is 16 feet wide and 35 feet long. The pool has a shallow end and a deep end, with a sloped floor connecting the two ends. Without water, the shallow end is 9 feet long and 4.5 feet deep, and the deep end of the pool is 12.5 feet long.



If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*?

Find the volume of the inside of the pool to the *nearest cubic foot*.

A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10.5 gallons per minute. How much time, to the *nearest hour*, will it take to fill the pool 6 inches from the top? [1 ft^3 = 7.48 gallons]

Answer Key – Volume Regents Practice

1. 340 cm^3

$$C = 2\pi r$$
$$31.416 = 2\pi r$$
$$5 \approx r$$

$$V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$$

2. \$19.50

$$2\left(\frac{36}{12} \times \frac{36}{12} \times \frac{4}{12}\right) \times 3.25 = 19.50$$

3. 203 grams

$$\frac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4 \qquad 19.4 \cdot 1.308 \cdot 8 \approx 203$$

4. 10.9 ft

$$20000\text{ g}\left(\frac{1\text{ ft}^3}{7.48\text{ g}}\right) = 2673.8\text{ ft}^3$$

$$9.9 + 1 = 10.9$$

$$2673.8 = \pi r^2(34.5)$$
$$r \approx 4.967$$
$$d \approx 9.9$$

5. 15 trees

$$r = 25\text{ cm}\left(\frac{1\text{ m}}{100\text{ cm}}\right) = 0.25\text{ m}$$

$$V = \pi(0.25\text{ m})^2(10\text{ m}) = 0.625\pi\text{ m}^3$$

$$W = 0.625\pi\text{ m}^3\left(\frac{380\text{ K}}{1\text{ m}^3}\right) \approx 746.1\text{ K}$$

$$n = \frac{\$50,000}{\left(\frac{\$4.75}{\text{K}}\right)(746.1\text{ K})} = 14.1$$

6. 536 pounds

$$V = \pi\left(\frac{5}{6}\right)^2(1.5) = 3.272\text{ ft}^3$$

$$3.272(.85) = 2.781\text{ ft}^3$$

$$2.781(95.46) = 265.533$$

$$266 + 270 = 536$$

7. 41 hours

$$\tan 16.5 = \frac{x}{13.5}$$
$$x \approx 4$$
$$4 + 4.5 = 8.5$$

$$9 \times 16 \times 4.5 = 648$$
$$13.5 \times 16 \times 4.5 = 972$$
$$\frac{1}{2} \times 13.5 \times 16 \times 4 = 432$$
$$12.5 \times 16 \times 8.5 = \underline{1700}$$
$$3752$$

$$3752 - (35 \times 16 \times .5) = 3472$$
$$3472 \times 7.48 \approx 25971$$
$$\frac{25971}{10.5} \approx 2473.4$$
$$\frac{2473.4}{60} \approx 41$$