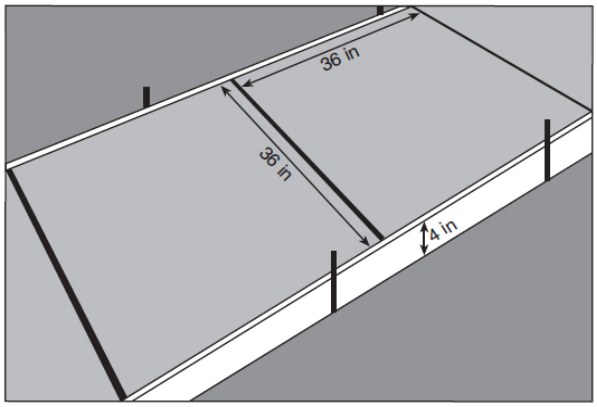
**Name: _____** **Date: _____**
**CC Geometry**

## 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.

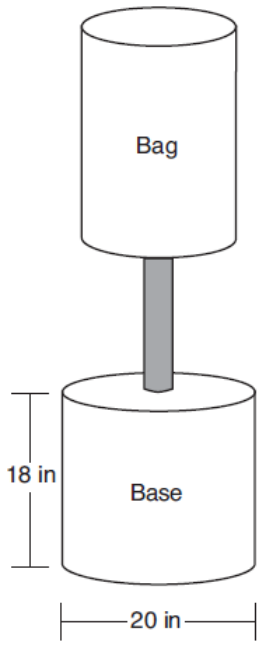
2. Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.




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

3. 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.

4. 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.

**Answer Key**

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. 15 trees

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

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

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

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

4. 536 pounds

$$V = \pi(10)^2(18) = 1800\pi\text{ in}^3$$

$$1800\pi\text{ in}^3\left(\frac{1\text{ ft}^3}{12^3\text{ in}^3}\right) = \frac{25}{24}\pi\text{ ft}^3$$

$$\frac{25}{24}\pi(95.46)(0.85) \approx 266$$

$$266 + 270 = 536$$