2. A certain brand of toilet is made in the United States and sold in Canada. It uses about 1.6 gallons per flush.

a) Convert the water usage per flush to quarts.

b) Approximately how many litres is this?

c) If the average person flushes 6 times per day, how much water is used per person?

d) About how many litres of water would the toilet of a typical family of four use in one day? $38.4\text{ qt} \times 4 = 153.6\text{ qt}$ family day

e) About how many litres of water would the toilet of a typical family of four use in one year? 56064 L

gal → qt

big → sm

$1.6\text{ gal} \times \frac{4\text{ qt}}{1\text{ gal}} = 6.4\text{ qt}$

b) $1\text{ qt} = 1\text{ L}$

$6.4\text{ qt} = 6.4\text{ L}$

c) $6.4\text{ qt} \times 6$

$= 38.4\text{ qt/day}$

A recap so far...

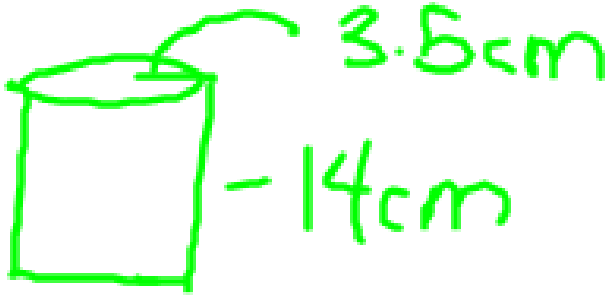
$V = A_{base} \times h$

$V_{rectangular\ prism} = \ell wh$

$V_{tri.\ prism} = \frac{bh\ell}{2}$

$V_{cylinder} = \pi r^2 h$

Example 1. A coffee cup is shaped like a cylinder and is 14 cm tall, with a radius of 3.5 cm. What is the volume of the cup?



Units!!!

$V = \pi r^2 h$

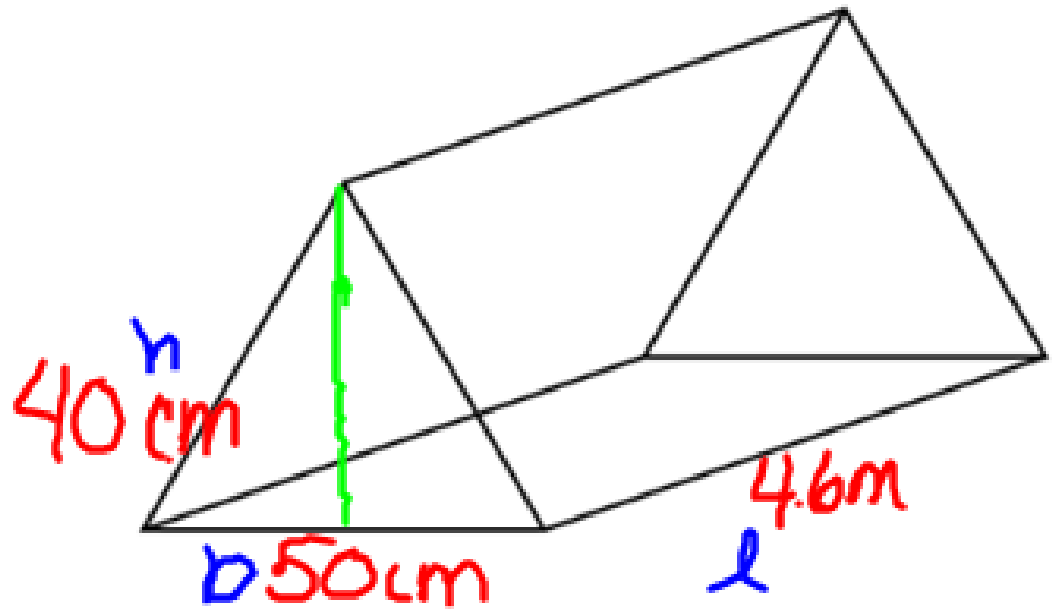
$= \pi (3.5)^2 (14)$

$= 38.4845 \times 14$

$= 538.7831 \text{ cm}^3$

$V = 538.78 \text{ cm}^3$

Example 2. Find the volume of the shape with the given dimensions.



$$V = \frac{bhl}{2}$$

$$= \frac{(50)(40)(460)}{2}$$

$$= \frac{920\,000}{2}$$

$$4.6\text{m} \times \frac{100\text{cm}}{1\text{m}} = 460\text{cm} \quad V = 460\,000\text{cm}^3$$

m → cm

big → sm

$V = 460\,000\,cm^3$

$m^3 = m \times m \times m$

$1\,cm^3 = \frac{1m}{100\,cm} \times \frac{1m}{100\,cm} \times \frac{1m}{100\,cm}$ (① ② ③)

$460\,000\,cm^3 \times \frac{1m}{100\,cm} \times \frac{1m}{100\,cm} \times \frac{1m}{100\,cm}$

$= 0.46\,m^3$

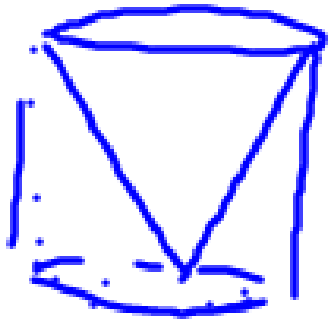
Volume of a Cone

Compare a cone and a cylinder with the same radius...which has a larger volume? Show using a diagram.

How much bigger does it seem?

A cylinder is actually 3 times larger than a cone. This means that to find the volume of a cone, we can use the formula of a cylinder, and then divide by 3.

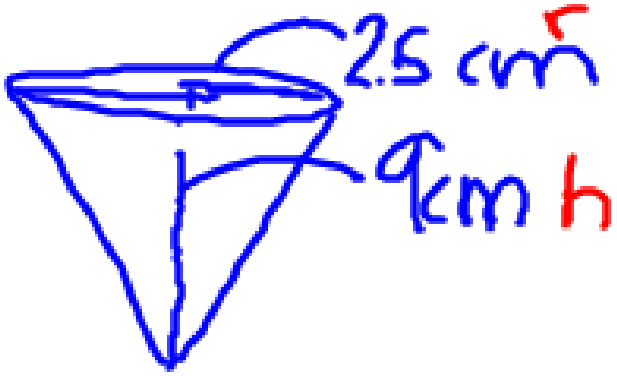
ie... $V_{cone} = \frac{\pi r^2 h}{3}$



Many businesses purchase cone-shaped cups because they are less expensive than other shapes.

a) Calculate the capacity of a conical paper cup with a diameter of 5 cm and a height of 9 cm, to the nearest cubic centimetre.

b) Calculate the height of a conical paper cup that has a diameter of 7 cm and a capacity of 130 cm^3, to the nearest tenth of a centimetre.



$V = \frac{\pi r^2 h}{3}$

$V = \pi(2.5)^2(9)/3$

$= \pi(6.25)(9)/3$

$= \frac{176.7146}{3}$

$\rightarrow V = 58.90 cm^3$

$V = 130\ cm^3$

$r = 3.5\ cm$

$h = ?$

$V = \pi r^2 h/3$

$130 = \pi (3.5)^2 h/3$

$130 = \dfrac{\pi (12.25) h}{3}$

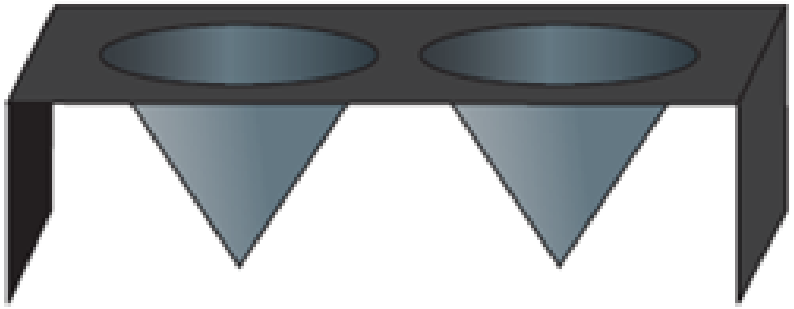
$130 = \dfrac{38.4845\, h}{3}$

$\dfrac{130}{12.8281} = \dfrac{12.8281 \cdot h}{12.8281}$

$10.1340\ cm = h$

Your Turn

A company manufactures conical metal moulds.



a) Calculate the capacity of one mould with a diameter of 2 in. and a height of $1\frac{1}{2}$ in., to the nearest tenth of a cubic inch.

b) Calculate the height of one mould that has a diameter of $2\frac{1}{2}$ in. and a capacity of 2 in.^{3}, to the nearest tenth of an inch.