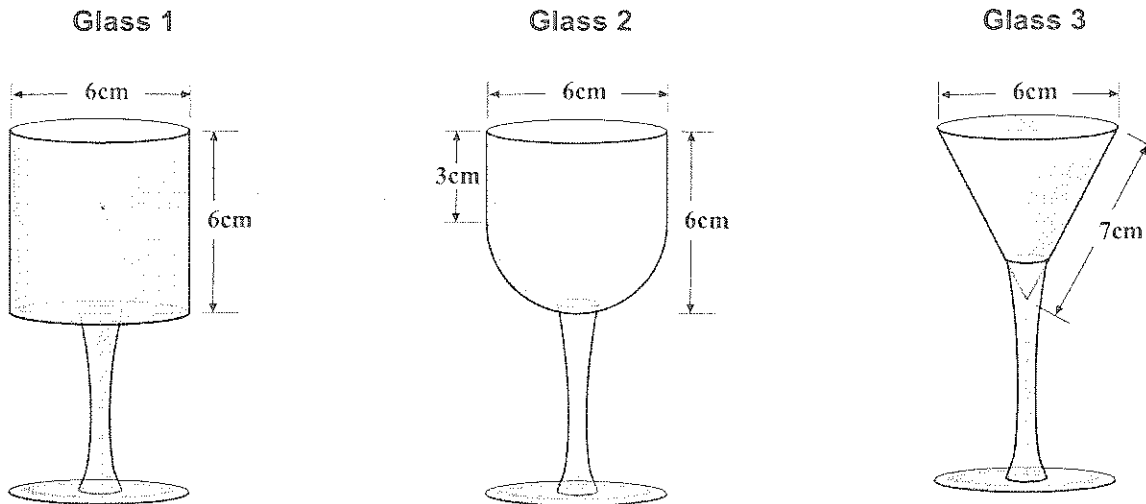


Name: _____

Glasses (Due at the end of class)



This picture shows three glasses.

The measurements are all in centimeters.

The bowl of Glass 2 has a cylindrical top and a hemispherical base.

The bowl of Glass 3 goes down into the stem.

1. Calculate the volume of liquid that would fill the bowl of each glass.
Show all your calculations and explain your reasoning.

a) Glass 1

$$V = BH \quad B = 9\pi$$

$$B = \pi r^2 \quad V = 6 \cdot 9\pi$$

$$H = 6 \quad V = 54\pi = 84.8$$

$$r = 3$$

b) Glass 2

$$\text{Cylinder} + \text{Hemisphere}$$

$$V_H = \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right) = 18\pi \quad V_C = BH = \pi r^2 H = \pi \cdot 9 \cdot 3 = 27\pi$$

$$r = 6$$

Total	18π
	$+ 27\pi$
	<hr/>
	45π

c) Glass 3

$$\frac{1}{3} BH \quad V = 3\sqrt{40}\pi$$

$$B = 3^2\pi \quad = 60\pi$$

$$H = \sqrt{40}$$

2. Find the height of liquid in Glass 2 when it is half full. (Half Volume)
Show how you figure it out

$$V_H = 18\pi \text{ cm}^3$$

$$V_C = 27\pi \text{ cm}^3$$

$$V_T = 45\pi \text{ cm}^3$$

$$\frac{1}{2}V = 22.5\pi \text{ cm}^3$$

$$\text{Extra} = 22.5\pi$$

$$- 18\pi$$

$$\frac{4.5\pi}{4.5\pi}$$

$$V_C = BH$$

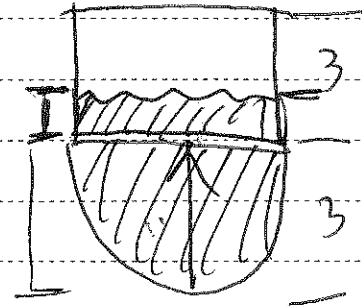
$$4.5\pi = \pi(3^2)h$$

$$\cancel{\pi} \pi$$

$$\frac{4.5}{9} = \frac{9h}{9}$$

$$.5 = h$$

$$\text{Total height} = 3 + .5 = 3.5 \text{ cm}$$



3. Glass 4 is shown in the diagram.
One of the following formulae gives the volume of Glass 4.
Which is it?

$$\frac{1}{6}\pi d^2 h \leftarrow \text{cm}^3$$

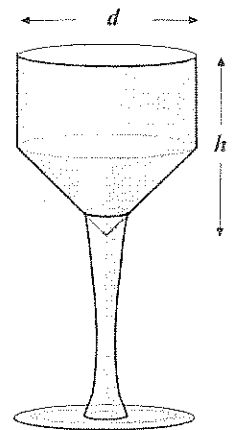
$$\frac{1}{6}\pi dh \leftarrow \text{cm}^2$$

$$\frac{1}{6}\pi dh^2 \leftarrow \text{cm}^3$$

$$\frac{1}{6}\pi d^2 h^2 \leftarrow \text{cm}^4$$

$$V = BH$$

$$\pi r^2 \cdot h$$



Glass 4

Explain how you can tell by just looking at the form of these expressions.

$$V = \times BH$$

$$\pi r^2 h$$

↓

$$\propto d^2$$