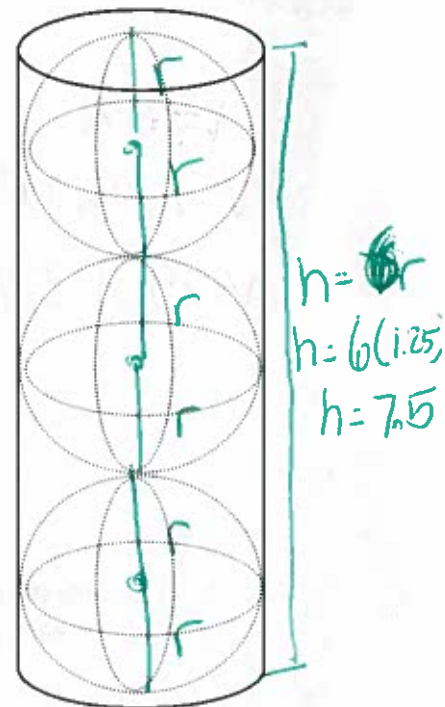


**WARM- UP!**

A tennis ball can is a cylinder. Inside the can are 3 spherical balls that are tangent to each other and to the sides of the can. A tennis ball has a surface area of  $6.25\pi$ . Find the volume between the balls and the can.



$$SA = 4\pi r^2$$

$$\frac{6.25\pi}{4\pi} = \frac{4\pi r^2}{4\pi}$$

$$1.5625 = r^2$$

$$\boxed{1.25 = r}$$

Volume of cylinder - 3 (Volume of sphere)

$$Bh - 3 \left( \frac{4}{3} \pi r^3 \right)$$

$$\pi r^2 h - 3 \left( \frac{4}{3} \pi r^3 \right)$$

$$\pi (1.25)^2 (7.5) - 3 \left( \frac{4}{3} \pi (1.25)^3 \right)$$

$$11.71875\pi - 7.8125\pi$$

$$\boxed{V = 3.90625\pi \text{ in}^3}$$

**Challenge Problems:**

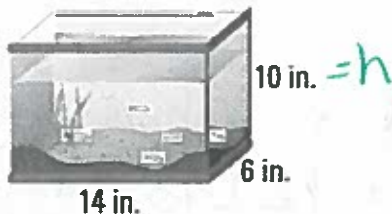
- Ms. Rehak's guppy, Dory, is outgrowing her fish tank. She looks into buying a new one and narrows it down to the two fish tanks below. Since Ms. Rehak wants to spoil Dory, she hopes to buy her the larger tank.

Using math to support your answer, which fish tank should Ms. Rehak buy?

$$V = B \cdot h$$

$$V = 84(10)$$

$$\boxed{V = 840 \text{ in}^3}$$



$$B = 14 \cdot 6 = 84$$

$$B = 6^2 \pi = 36\pi$$

$$V = B \cdot h$$

$$V = 36\pi(15)$$

$$\boxed{V \approx 1696.5 \text{ in}^3}$$



She should buy the cylinder tank because it has more volume.

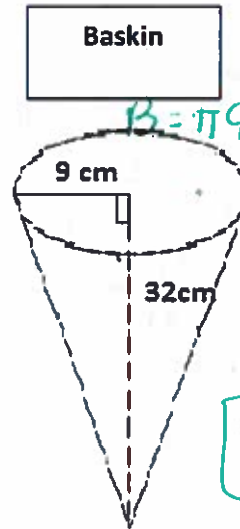
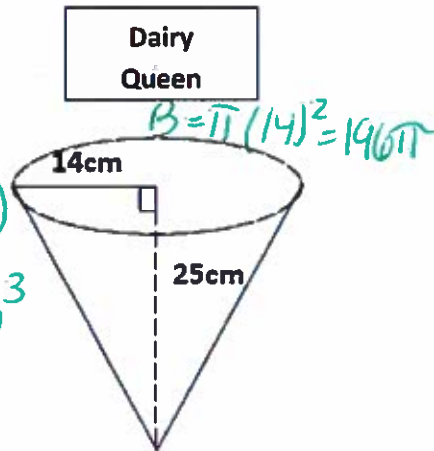
2. M. Rehak wants to buy ice cream cones for her honors students. She has two choices: Dairy Queen or Baskin Robins. Each is the same price. Their cones are shaped as follows. Which place would you like her to buy and why?



$$V = \frac{1}{3} B \cdot h$$

$$V = \frac{1}{3} (196\pi) (25)$$

$$V \approx 5131.27 \text{ cm}^3$$



$$B = \pi (14)^2 = 196\pi$$

$$B = \pi (9)^2 = 81\pi$$

$$V = \frac{1}{3} B \cdot h$$

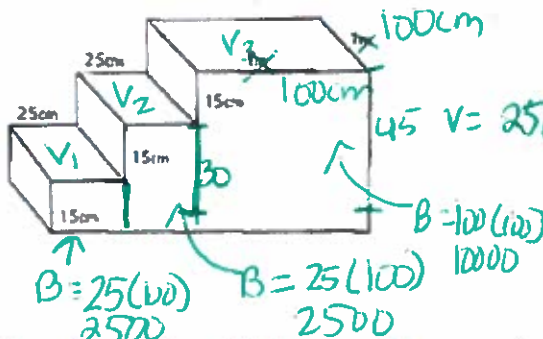
$$V = \frac{1}{3} (81\pi) (32)$$

$$V \approx 2714.34 \text{ cm}^3$$



3. A concrete staircase is to be built. Each step is 15 cm high, 25 cm deep, and 1 m wide. The top platform is a square. What volume of concrete is needed?

$$1 \text{ m} = 100 \text{ cm}$$



$$V_1 + V_2 + V_3$$

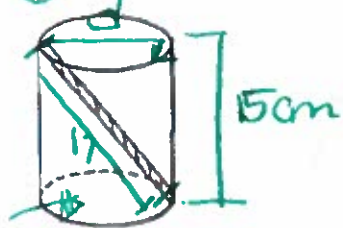
$$B \cdot h + B \cdot h + B \cdot h$$

$$45 \text{ v} = 2500(15) + 2500(30) + 10000(45)$$

$$V = 37500 + 75000 + 450000 =$$

$$V = 562500 \text{ cm}^3$$

4. Find the volume of a cylindrical glass if its height is 15 cm and a 17 cm straw fits inside as shown.



$$B = \pi (4)^2 = 16\pi$$

$$15^2 + d^2 = 17^2$$

$$225 + d^2 = 289$$

$$d^2 = 64$$

$$d = 8$$

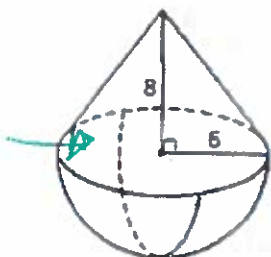
$$r = 4$$

$$V = B \cdot h$$

$$V = 16\pi (15)$$

$$V = 240\pi \text{ cm}^3$$

5. Find the total volume.



$$B = \pi (6)^2$$

$$36\pi$$

$$V_{\text{cone}} + V_{\text{hemisphere}}$$

$$\frac{1}{3} B \cdot h + \frac{1}{2} (\frac{4}{3} \pi r^3)$$

$$\frac{1}{3} (36\pi) (8) + \frac{1}{2} (\frac{4}{3} \pi (6)^3)$$

$$96\pi + 144\pi$$

$$V = 240\pi \text{ u}^3$$