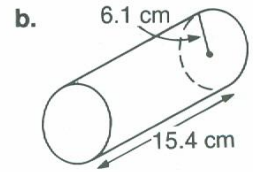
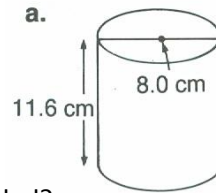
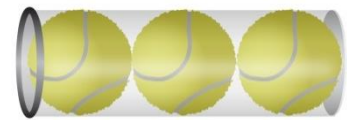


Answer the following questions on a separate sheet of paper. Show your work.

1. i) Determine the **volume** of each cylinder.
 ii) Determine the **surface area** of each cylinder.



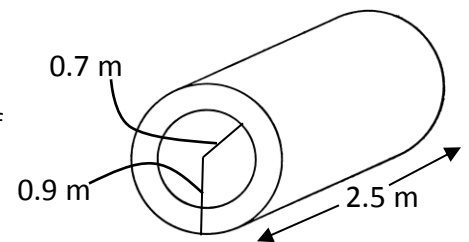
2. A can of soup is 10.3 cm high and its diameter is 6.7 cm.
 - a) How much paper is required to make the soup can label?
 - b) A box that is shipped to the grocery store contains 12 cans each. What volume of soup is in the box, in litres? (Note: $1\text{ cm}^3 = 1\text{ mL}$ and $1000\text{ mL} = 1\text{ L}$)
3. The volume of a cylinder is 972 cm^3 . If the radius of the base is 5 cm, what is the height of the cylinder?
4. Three tennis balls, each 8cm in diameter, are stacked in a cylindrical container.
 - a) Determine the minimum volume of this container.
 - b) Determine the minimum amount of packaging required to make the container.



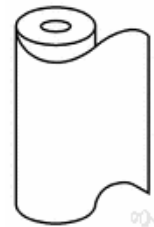
5. To store his grain, Gary is building a cylindrical silo that must have a volume of 185 m^3 . The height of the silo must be 15 m. What should the measure of the radius be, to the nearest hundredth of a meter?
6. A farmer had this temporary hoop barn built to store hay bales. The diameter of the structure is 60 ft and the length is 100ft. If the semi-cylindrical support posts are anchored to a cement foundation wall that is 1.2 feet off the ground, determine:
 - a) the amount of space inside of the structure.
 - b) The amount of fabric required to cover the support posts (assume both ends are left open)



7. A marble column in the shape of a cylinder is 9.0 m high and 82 cm in diameter. If the mass of 1 m^3 of marble is 3000 kg, find the mass of the column.
8. The dimensions for a section of concrete pipe used to make storm sewers, is shown in the diagram to the right. Calculate the volume of concrete that is needed to make this section of pipe, to the nearest tenth of a cubic meter.



9. The "Toothpicker" Company sells toothpicks in boxes and in cylindrical containers. Each box is 3.8 cm by 2.1 cm by 6.1 cm and each cylinder is 6.1 cm high and 2.7 cm in diameter. Which package uses less material to make? How much less material does it require?
10. Paper towels are sold in boxes of 6 rolls. Each roll is a cylinder with a height of 30cm and an outer diameter of 12 cm. If the inner diameter of each roll is 4 cm, how much wasted space is there in the box? (Assume the box is made to **just** fit the paper towels).



Answers:

1. ia) 583.1 cm^3	ib) 1800.2 cm^3	iiia) 392.1 cm^2	iib) 824.0 cm^2	2.a) 217 cm^2	2.b) 4.36 L
3. 12.4 cm	4.a) 1206.4 cm^3	b.) 703.7 cm^2	5. 1.98 m	6.a) 148571.7 ft^3	6.b) 9424.8 ft^2
7. 14258.7 kg	8. 2.5 m^3	9. Cylinder by 24.75 cm^2	10. 7824.4 cm^3		