## *Performance Task Item: Designing a Package*
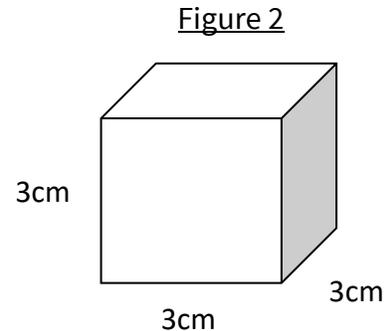
Task/Question 1:

A. Write the formula for finding the volume of a right cylinder:

B. Write the formula for finding the volume of a sphere:

C. Write the formula for finding the surface area of a right cylinder:

D. Write the formula for finding the volume of a cone:

E. Write the formula for finding the surface area of a rectangular prism:

F. Calculate the volume and surface area of each object (use 3.14 for Pi):

<u>Figure 1</u>

10cm

r = 5cm

<u>Figure 2</u>

3cm
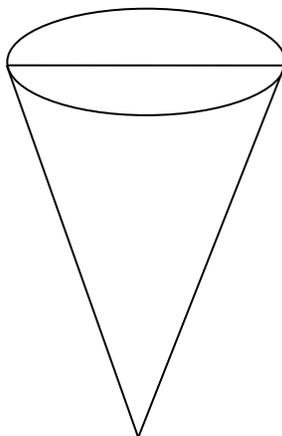
3cm

3cm
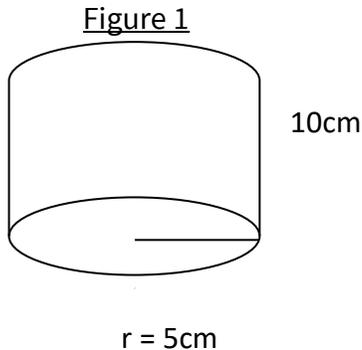
V = _____ SA = _____   V = _____   SA = _____

Task/Question 2:

A large ice-cream cone is on sale at Frosty Slab for $3.75. It is 8 inches tall and 4 inches across the base of the cone. When filling the ice-cream cone, the workers level the cone to the base.

A. Label the figure below with the correct ice-cream cone dimensions:

B. Find the volume of the cone in Task A:
(Use 3.14 for pi and round to the nearest tenth)

V = _____

C. Explain how you figured out the volume of the cone in Task B:

Task/Question 3:

Tommy, from Tommy's Vending Machine Company, surveyed golf players regarding their need for extra golf balls before going out on the course. Several of the players said they had stopped to purchase more golf balls at a sports store on their way to the club. Tommy thought it would be advantageous to have them available at the site for purchase from his vending machine. However, he would need a container that could fit into his vending machines.

Rabeesha, an engineer at Geometrics Design Corp., was hired by Tommy to design a cylindrical container for purchase. She was instructed to design a package to hold six golf balls in one vertical row.

A. If each golf ball has a radius of 0.84 inches, what must the height and diameter of the container be?

      Dimensions: Diameter_____ Height _____

B. List the volume of the container from Task A (use 3.14 for Pi and round to the nearest tenth):

C. Explain how you figured out your dimensions for the container (Diameter & Height):

Task/Question 4:

The container used in task/question 3 was too difficult for the company to make because of its dimensions. Rabeesha, the engineer, called Tommy to see if they could use different sized golf balls with a diameter of 1.75 inches. This measure would allow her to make a container using inch and half inch measures which would be much easier to make. To keep the cost down, Tommy agrees, but wants to keep the number of golf balls in each container to be ten or less.

A. How many golf balls will the container hold if you change all dimensions to meet Rabeesha's new design?

B. Draw a picture of the new design; label all the dimensions:

C. Calculate the volume of the new designed package

   V = _____

D. Justify and Defend how your process is the **most effective** way to determine the dimensions for the new package design: