STUDENT MATERIALS

TASK 1 – MAKE THE CHANGE

Here are the formulas you may want to use:

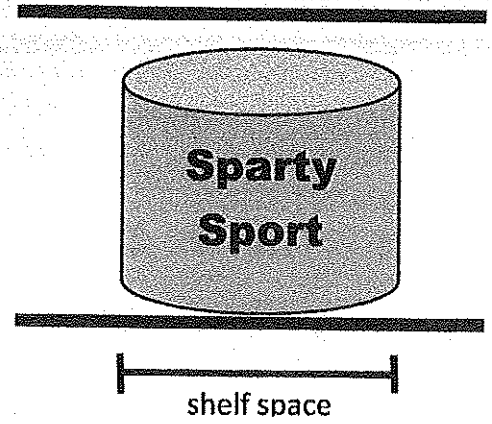
Sphere	Cylinder	Cone
$V = \frac{4}{3}\pi r^3$	$V = \pi r^2 h$	$V = \frac{1}{3}\pi r^2 h$

A manufacturer designed three containers, all of which had volumes of 1000 milliliters. One was a cylinder; one was a sphere; and the third was a cone. It wanted to know how doubling one of the dimensions would change how much the container would hold. Give the volume of each of the containers after the change was made.

Original Container and volume	Change	Volume of New Container in mL
Cylinder: 1000 mL	the height is doubled	$1000 = \pi r^2 h$ 2000 mL
Cone: 1000 mL	the diameter is doubled	$1000 = \frac{1}{3}\pi r^2 h$ 4000 mL
Sphere: 1000 mL	the radius is doubled	$1000 = \frac{4}{3}\pi r^3$ 8000 mL

TASK 2 – DESIGN IT

Michigan State University students are designing containers for Sparty Sport, a new sports drink. They need bottle designs for 40 ounces of sports drink, which is about 72 cubic inches.



1. Use the facts given about each design below and compute the amount of shelf space (in inches) that would be needed for the container. Shelf space is the amount of space that would need to be reserved to feature that product on store shelves.

Sphere	Cylinder	Cone
Holds 72 cubic inches	**Holds 72 cubic inches** **Height is 8 inches**	**Holds 72 cubic inches** **Height is 8 inches**
Amount of shelf space needed for this design to the nearest inch: $72 = \frac{4}{3}\pi r^3$ about 3 inches	**Amount of shelf space needed for this design to the nearest inch:** $72 = \pi r^2 \cdot 8$ about 2 inches	**Amount of shelf space needed for this design to the nearest inch:** $72 = \frac{1}{3}\pi r^2 \cdot 8$ about 3 inches

2. Sparty Sport asks you which would be the best container to use on store shelves. Choose one and give reasons to justify your choice.

The cylynder is best

- it needs the least amount of shelf space per bottle

- you can fill the shelves more