Geometry – Measurements of Three-Dimensional Figures   Name _____
16e Homework: Density   **Pd** _____   **Date** _____

Show all work to earn full credit.

1. A farmer is going to build a greenhouse to grow lettuce plants. He wants a density of at most
   100 lettuce plants per 800 cubic feet. Find the maximum number of lettuce plants that can be
   contained in the following setups. Round off to the nearest whole number of lettuce plants.

   A. A cylindrical greenhouse with radius of 12 feet and height of 7 feet.

   B. A rectangular prism greenhouse with height of 12 feet, length of 9 feet and a width of 9
   feet.

   C. A semi-circular prism greenhouse with diameter = 14 feet and length 25 ft.
   Note: this is a common shape for greenhouses. In this case, the cylinder is vertically cut in half
   and then placed on its side, along the cut. This is also known in the military as a Quonset hut.

2. Density is an important concept studied in Chemistry: **Density** $= \dfrac{Mass}{Volume}$

"Mass" is the amount of matter that an object or substance contains, and is often measured by the objects weight, in grams.

"Volume" is the amount of space occupied (or contained) by the object, and is measured in cubic units.

During lab experiment in Chemistry class, students were analyzing the density of pennies that were made before 1982 and pennies made in 1982 and beyond.

A. For the pennies that were made before 1982, students measured the mass, height (thickness) and diameter of each penny:

Mass = 3.1 grams
height/thickness = .127 centimeters
diameter = 1.9 centimeters

Determine the density of a penny that was made before 1982.

B. For the pennies that were made in 1982 and after, students measured the mass, height (thickness) and diameter of each penny:

Mass = 2.5 grams
height/thickness = .127 centimeters
diameter = 1.9 centimeters

Determine the density of a penny that was made in 1982 and beyond.

C. A penny is mainly made of copper and zinc. The density of copper is $8.96 \dfrac{g.}{cm.^3}$ and the density of zinc is $7.13 \dfrac{g.}{cm.^3}$. Using your answers about the density of the different pennies (in parts A and B above), what can you conclude about what the pennies made before 1982 were mostly made of and what the pennies made in 1982 and beyond were mostly made of?