Name: *Answer Key*   Date: _____

Geometry and Density Practice

$$Density = \frac{mass}{volume}$$

1) A wooden <u>cube</u> has an edge length of 6 centimeters and a mass of 137.8 grams. Determine the density of the cube, to the *nearest thousandth*.

$$V = 6 \times 6 \times 6 = 216 \text{ cm}^3$$

$$D = \frac{137.8}{216} = \boxed{0.638 \text{ g/cm}^3}$$

2) A shipping container is in the shape of a <u>right rectangular prism</u> with a length of 12 feet, a width of 8.5 feet, and a height of 4 feet. The container is completely filled with contents that weigh on average, 0.25 pound per cubic foot. What is the weight, in pounds, of the contents of the container?

$$V = 12 \times 8.5 \times 4 = 408 \text{ ft}^3$$

$$D = \frac{m}{V} \longrightarrow \frac{0.25}{1} = \frac{m}{408} \qquad m = 408(0.25)$$

$$\boxed{m = 102 \text{ lbs}}$$

3) A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1,015 cubic centimeters. Steel can be purchased for $0.29 per kilogram, and has a density of .00795 kg/cm³. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

$$\frac{.00795}{1} = \frac{m}{1,015} \qquad m = (.00795)(1,015) = 8.06925 \text{ kg}$$

Price of
Steel for $(500)(8.06925)(0.29) = \boxed{\$ 1,170}$
500 parts

4) A hemispherical tank is filled with water and has a diameter of 20 ft. The tank contains 1,047 cubic feet of water. What percent of the tank is <u>empty</u>? $r = 10$

$$V = \frac{4}{3}\pi (10)^3 = \frac{4,188.79}{2} = 2,094.395102$$

$$\frac{1047}{2,094} \approx 50\% \text{ full, so the tank is } 50\% \text{ empty}$$

reetangular prism

5a) A contractor needs to purchase 300 bricks. The dimensions of each brick are .51 m by .12 m by .23 m, and the density of each brick is 1920 pounds/m^3. Find the average mass of each boulder in pounds.
(Round to the nearest tenth of a pound)

$$V_{brick} = (.51)(.12)(.23) = .014076 \ m^3$$

$$\frac{1920}{1} = \frac{m}{.014076} \qquad \boxed{m = 27.0 \ lbs}$$

b) The maximum carrying capacity of the contractor's trailer is 900 lbs. Can the trailer hold the weight of 300 bricks? If no, how many trips will the contractor need to make to transport all of the bricks.

$$(27)(300) = \underline{8,100 \ lbs} \qquad \text{total weight of all 300 bricks}$$

$$\boxed{\underline{NO!}}$$

$$\frac{8,100}{900} = \boxed{9 \ trips}$$