

## Density/Percent Error Problems

1. What is the volume of a tank that can hold 18 754 Kg of methanol whose density is  $0.788\text{g/cm}^3$ ?
2. What is the density of a board whose dimensions are 5.54 cm x 10.6 cm X 199 cm and whose mass is 28.6 Kg?
3.  $\text{CaCl}_2$  is used as a de-icer on roads in the winter. It has a density of  $2.50\text{ g/cm}^3$ . What is the mass of 15.0 L this substance?
4. My gas tank in my car has a total volume of 68 L. The manual says the gas gauge light will come on when there are only 5 L remaining in the tank and that the car will not be able to draw on the last 2 L in the tank. Practically speaking, what is the functional volume of the gas tank? If I ran out of gas, the car won't go, and I put in 5 L of gas, what is the total volume of gas in my tank? If 5 L of gas has a mass of 450 Kg, what is the mass of the gas in my tank? What is the density of the gas?
5. The density of paper is  $1.20\text{ g/cm}^3$ . What is the mass of the paper in a notebook that is 76 mm thick, 215.9 mm wide, and 279.4mm long?
6. In pottery class, you throw a pot from a lump of wet clay. Your pot's mass is 5.5 Kg. After the pot is fired, its mass is 4.9 Kg. The density of wet clay is  $1.60\text{ g/cm}^3$  and the density of fired clay is  $1.36\text{ g/cm}^3$ . What was the volume of your pot before it was fired? What was the volume of the pot after it was fired?
7. The volume of the aquarium in our classroom is 1890 L. The density of seawater is  $1.03\text{g/cm}^3$ . What is the mass of the water in our tank?
8. Spanish mahogany is a red, lustrous wood. It is prized over Honduras mahogany, which does have the characteristic red color and similar grain, but is the wood is not as compact and has a looser appearance than the Spanish mahogany. A hope chest made of Honduras mahogany has a volume of  $.648\text{ m}^3$  and a mass of 349 Kg. An identical hope chest made of Spanish mahogany has a mass of 550.8 Kg. What is the density of Honduras mahogany? What is the density of Spanish mahogany?

*Calculate the Percent Error of each of the following.*

9. Samantha S. Sloppiness measured the volume of her soda before she drank it for her midmorning snack. She measured the volume of the 12 oz. bottle to be 14 oz.
10. Clyde Clumsy was directed to weigh a 500 g mass on the balance. After diligently goofing off for ten minutes, he quickly weighed the object and reported 458 g.
11. Pretty Patty Pestilence had casually recorded her grades for the nine weeks in her notebook. She concluded she had 250 points out of 300 for the grading period. However, Miraculous (chem teacher) determined she had 225 points out of 300 and awarded her a "C" for the grading period.
12. Drew D. Dingaling came to Miraculous with a problem. Drew was told to measure 50 cm of copper wire to use in an experiment. Since his ruler only measured to 45 cm he used this amount of wire and his experiment was a failure.
13. Henry Heavyfoot was just arrested for speeding by Officer O'Rourke for traveling 65 mph in a 55 mph zone. Henry claimed his speedometer said 55 mph not 65 mph.
14. Willomina Witty was assigned to determine the density of a sample of nickel metal. When she finished, she reported the density of nickel as  $5.59\text{ g/ml}$ . However, Miraculous knew the density of nickel was  $6.44\text{ g/ml}$ .
15. An experiment to determine the volume of a "mole" of a gas was assigned to Barry Bungleditup. He didn't read the experiment carefully and concluded the volume was 18.7 liters. Miraculous knew he should have obtained 22.4 liters.

**Answers (in random order): 1,946,700g; 13.2%; functional volume of tank is  $68\text{L} - 2\text{L} = 66\text{L}$  gas; "empty tank" + 5 L = 7 L gas; 630 kg;  $90\text{ kg/cm}^3$ ; 16.6%;  $538.6\text{ kg/cm}^3$ ;  $850\text{ kg/cm}^3$ ; 16.5%;  $0.00245\text{ kg/cm}^3$ ; 10.0%;  $3437.5\text{ cm}^3$ ;  $3602.9\text{ cm}^3$ ; 8.40%; 37,500 g; 15.4%;  $23,799,492.4\text{ cm}^3$ ; 11.1%; 5501.4 g**