CONCEPT: LAW OF DEFINITE PROPORTIONS

- In 1799, the French chemist Joseph L. Proust, originated the **Law of Definite Proportions**.
  - □ It is also sometimes referred to as the Proust's Law, Law of Constant or Definite Composition.
  - □ **Mass ratio**: Proportions of elements by mass.
  - □ Different samples of a pure chemical compound always contain the _____ proportions of elements by mass.
  - □ For the **mass ratio**, place the element with the _____ **mass** on the top.

CO_2

6
C
Carbon
12.01

8
O
Oxygen
16.00

__ C x 12.01 g/mol =
__ O x 16.00 g/mol =

Mass Ratio = _____ =

EXAMPLE: Two unknown compounds are examined. Compound A contains 2.0 grams of hydrogen and 32.0 grams of oxygen. Compound B contains 15.0 grams of hydrogen and 120.0 grams of oxygen. Do Compounds A and B represent the same compound?

Proportions

- You can determine the unknown amount of an element if you know the **mass ratio** and the mass of the other element.
  - □ This is accomplished through the use of a proportion.

EXAMPLE: A compound contains only calcium and fluorine. A sample of the compound is determined to contain 2.00 g of calcium and 1.90 g of fluorine. According to the Law of Definite Proportions, how much calcium should another sample of this compound contain if it possesses 2.85 g of fluorine?

a) 2.71 g b) 4.00 g c) 3.00 g d) 4.50 g e) 6.00 g

PRACTICE: A 7.74 g sample of HCN is found to contain 0.287 g of H and 4.01 g N. Find the mass of carbon in a sample of HCN with a mass of 3.43 g.