Ratios

The math name for a fraction is ratio. A ratio is just a fancy way to say a fraction. In the Culinary Arts, you use ratios all the time. The Working Factor is a ratio.

$$\text{working factor} = \frac{\text{new yield}}{\text{old yield}}$$

You can use ratios when you convert from one unit to another. Since 16 ounces = 1 pound, the conversion ratios are

$$\frac{\text{16 ounces}}{\text{1 pound}} \quad \text{and} \quad \frac{\text{1 pound}}{\text{16 ounces}}$$

You can see that these ratios relate pounds and ounces.

Example 1: using a ratio
To convert from 2 pounds into an equivalent number of ounces, we use the first ratio.

$$\text{2 pounds} * \frac{\text{16 ounces}}{\text{1 pound}} = \text{2 } \cancel{\text{pounds}} * \frac{\text{16 ounces}}{\text{1 } \cancel{\text{pound}}} = \text{32 ounces}$$

so 2 pounds equals 32 ounces.

Example 2: using a ratio
To convert from 40 ounces into an equivalent number of pounds, we use the second ratio.

$$\text{40 ounces} * \frac{\text{1 pounds}}{\text{16 ounces}} = \text{40 } \cancel{\text{ounces}} * \frac{\text{1 pounds}}{\text{16 } \cancel{\text{ounces}}} = \text{2.5 pounds}$$

so 40 ounces equals 2.5 pounds.

Notice that in each case, you use the conversion ratio that forces the units to cancel (divide) out. The units tell you which form of the conversion ratio you must use.

Proportions

A proportion is two ratios set equal to one another. That is, a proportion is a fraction equal to a fraction. The above problems can be done using proportions. Note that one of the conversion ratios is used. Surprisingly, it doesn't matter which one you pick to use in the proportion. The result will always be the same. Just make sure you put the units in the same order as the conversion proportion. The units on the left side of the proportion must always be the same as the units on the right side of the proportion.

Example 1: using a proportion to change units
To convert from 2 pounds into an equivalent number of ounces

$$\frac{\text{n ounces}}{\text{2 pounds}} = \frac{\text{16 ounces}}{\text{1 pound}}$$

Crisscross multiply. (This can be done ONLY with proportions).

n * 1 = 2 * 16
Therefore, 2 pounds is the same as 32 ounces.

OR:

$$\frac{\text{2 pounds}}{\text{n ounces}} = \frac{\text{1 pound}}{\text{16 ounces}}$$

Crisscross multiply. (This can be done ONLY with proportions).

n * 1 = 2 * 16