ice that the dollars have divided out, leaving an answer in the red unit—quarters.

uppose you had guessed wrong and used 1 dollar/4 quarters when osing which of the two conversion factors to use. You would have an ver with entirely inappropriate units.

$$\text{? quarters} = 12 \text{ dollars} \times \frac{1 \text{ dollar}}{4 \text{ quarters}} = \frac{3 \text{ dollars}^2}{\text{quarter}}$$

will work many problems in this book. It is always best to begin an idea of the units you will need in your final answer. When work- hrough the Sample Problems, keep track of the units needed for the nown quantity. Check your final answer against what you've written ne unknown quantity.

riving Conversion Factors

can derive conversion factors if you know the relationship between nit you have and the unit you want. For example, from the fact that means "1/10," you know that there is 1/10 of a meter per decimeter that each meter must have 10 decimeters. Thus, from the equality

$$1 \text{ m} = 10 \text{ dm}$$

can write the following conversion factors relating meters and meters.

$$\frac{1 \text{ m}}{10 \text{ dm}} \text{ and } \frac{0.1 \text{ m}}{\text{dm*}} \text{ and } \frac{10 \text{ dm}}{\text{m}}$$

following sample problem illustrates an example of deriving con- ion factors to make a unit conversion.

AMPLE PROBLEM 2-2

Express a mass of 5.712 grams in milligrams and in kilograms.

SOLUTION

Given: 5.712 g
Unknown: mass in mg and kg

The expression that relates grams to milligrams is

$$1 \text{ g} = 1000 \text{ mg}$$

The possible conversion factors that can be written from this expression are

$$\frac{1000 \text{ mg}}{\text{g}} \text{ and } \frac{1 \text{ g}}{1000 \text{ mg}}$$

is book, when there is no digit shown in the denominator, you can assume the e is 1.