Conversions

Conversion Factors

As the world becomes more international, it is becoming more important for people to be able to convert from American (Customary) and International units. Converting from one unit to another will always use something called a conversion factor, which simply states how two units are related to each other. For example we know that there are 60 seconds in a minute, so the conversion factor is 1 minute = 60 seconds.

Use the internet to find the following conversion factors.

1. 1 mile (mi) = _____ feet (ft)
2. 1 inch (in) = _____ centimeters (cm)
3. 1 gallon (gal) = _____ liters (L)
4. 1 fluid ounce (fl oz) = _____ milliliters (mL)
5. 1 pound (lb) = _____ kilogram (kg)

Steps for Converting

The process for converting units follows a specific set of steps. For simple problems, it may seem like too much work, but it is essential that you learn to use the steps in order to perform more complicated conversions.

Steps For Conversions

1. Place the given (starting value) over 1.
2. We create a second fraction and place the units in the correct places:
   a. The unit we started with goes on the bottom. (This will cause it to cancel out)
   b. The unit we are converting to goes on top.
3. Plug in the numbers from the conversion factor into the second fraction. Matching the numbers up with their corresponding units.
4. Multiply and simplify the fractions to get your answer. This means you will multiply the given by numbers on the top and divide by numbers on the bottom.

EXAMPLE

How many cm are in 73 inches? (1 in = 2.54 cm)

1. $\frac{73\ in}{1}$
2. $\frac{73\ in}{1} \cdot \frac{cm}{in}$
3. $\frac{73\ in}{1} \cdot \frac{2.54\ cm}{1\ in}$
4. $\frac{73\ in}{1} \cdot \frac{2.54\ cm}{1\ in} = \frac{185.42}{1}\ cm$

73 in = 185.42 cm

Now lets go step by step a few times.

1. How many miles are in the Olympic 10 km race? (1 mi = 1.61 km)
   a. Step 1: Place the given over 1.

   _____

   b. Step 2: Create a second fraction and place **only the units** in the right spot.

   _____ . _____

   c. Step 3: Plug in **the numbers** from the conversion factor.

   _____ . _____

   d. Step 4: Multiply the fractions and simplify.

   _____ . _____ =

2. How many fluid ounces are in a 2 L bottle of Coke? (1 L = 33.81 km)
   a. Step 1: Place the given over 1.

   _____

   b. Step 2: Create a second fraction and place **only the units** in the right spot.

   _____ . _____

   c. Step 3: Plug in **the numbers** from the conversion factor.

   _____ . _____

   d. Step 4: Multiply the fractions and simplify.

   _____ . _____ =

Practice
Use significant figures to determine where to round.

1. How many mL in 4.75 L? (1 L = 1000 mL exactly)

2. How many s in 458 hour? (1 hr = 3600 s exactly)

3. How many fluid ounces in 68.3 mL? (1 fl. oz. = 29.6 mL)

4. How many miles in 8,000,000 inches? (1 mi = 63,360 in exactly)

5. How many ounces in 4.58 kg? (1 kg = 35.27 oz)

6. How many gallons in 1000 L? (1 gal = 3.785 L)

7. How many kilometers are in 22.5 miles? (1 mile = 1.61 km)

8. How many yards in 750 ft? (1 yd = 3 ft exactly)

