

FACTOR LABEL METHOD

You will do many conversion problems in this class. Here is the approach that I will use throughout the quarter.

Example 1: The distance between two cities is 358 miles. How many kilometers separate the cities?

1. Ask yourself the following question: What are the units of the answer?

In this case the units are kilometers.

2. Write down the units of the answer followed by an = sign

$$km =$$

3. Ask yourself the following question: Are there any conversion factors that I can use that have the units of the answer in them?

From a table you find that 1.000 mile = 1.609 km.

4. Put in the conversion factor that has the correct units into the equation that you started in step 2 in such a way that the unit of the answer is on top.

$$km = \frac{1.609km}{mile}$$

5. Ask yourself the following question: Is there any factors that I can use that will enable me to cancel out the units of mile?

In this the question asked you to start with 358 miles.

6. Put in this conversion factor that has the correct units into the equation such a way that you can cancel out the unit of mile.

$$km = \frac{1.609km}{mile} \times \frac{358mile}{1}$$

7. Now the units of mile cancel out and we are left with the units of the answer.

$$km = \frac{1.609km}{mile} \times \frac{358mile}{1}$$

$$= (1.609)(358) km = 576.0 km$$

Example 2: If a car travels at 65 miles per hour, how many meters per second does it travel?

In some cases it might be necessary to make a flow chart.

1. Ask yourself the following question: What are the units of the answer?

In this case the units are meters/second

2. Here is a flow chart that may help you.

$$\frac{m}{s} =$$

m → km → mile → hours → minutes → second.

3. Here is the math

$$\begin{aligned}\frac{m}{s} &= \frac{1000m}{km} \times \frac{1.609km}{mile} \times \frac{65mile}{hour} \times \frac{hour}{60\text{ min}} \times \frac{\text{min}}{60\text{sec}} \\ &= 29.05 \frac{m}{s}\end{aligned}$$