

Section 10.2

READING AND SELF-DISCOVERY QUESTION

10.2

- When converting units between metric and U.S. systems, which unit of measure should be in the numerator of the unit fraction being used to make the conversion?

The unit to which you are converting.

CRITICAL THINKING QUESTION

10.2

- How does the process for converting units *between* the U.S. and metric systems differ from the process of converting units *within* either system?

Converting between the U.S. and the metric systems uses unit fractions. Converting within the U.S. system requires unit fractions, but within the metric system only requires moving the decimal point based on the prefix chart.

DEMONSTRATE YOUR UNDERSTANDING

10.2

- Perform the following conversions:

$$60 \text{ cm} = \underline{\quad 600 \quad} \text{ mm}$$

$$15 \text{ mL} = \underline{\quad 0.000015 \quad} \text{ kL}$$

$$600 \text{ km} = \underline{\quad 600000 \quad} \text{ m}$$

$$25 \text{ mg} = \underline{\quad 0.025 \quad} \text{ g}$$

- If you want to get from Toronto to Montreal as quickly as possible (while obeying all speed laws, of course), would you rather travel 100 kph (kilometers per hour) or 67 mph?

$$100 \text{ kph} \cdot \left(\frac{.62 \text{ mph}}{1 \text{ kph}} \right) = 62 \text{ mph}$$

100 kph is only 62 mph. 67 mph will get me there more quickly.

- Many highways in the United States have speed limits of 70 mph. What is the maximum speed you could travel in kph and not go over the speed limit?

$$70 \text{ mph} \cdot \left(\frac{1.6 \text{ kph}}{1 \text{ mph}} \right) = 112 \text{ kph}$$

70 mph is 112 kph. That's as fast as I could drive without going over the 70 mph speed limit.

IDENTIFY AND CORRECT THE ERRORS

10.2

In the second column, identify the error(s) you find in each of the following worked solutions. Describe the error made in the second column. Solve the problem correctly in the third column.

Problem	Describe Error	Correct Process
1. Perform the following conversion: 70 km/hr to miles/hour	Student used the wrong conversion factor.	$\frac{1 \text{ mi}}{1.6 \text{ km}}$ $70 \cdot \frac{\text{km}}{\text{hr}} \cdot \left(\frac{1 \text{ mi}}{1.6 \text{ km}} \right)$ $= \frac{70}{1.6} \cdot \frac{\text{mi}}{\text{hr}} = 43.74 \frac{\text{mi}}{\text{hr}}$
Worked Solution (What is wrong here?)		
$\frac{70 \text{ km}}{\text{hr}} \times \frac{1 \text{ mi}}{0.62 \text{ km}}$ $= \mathbf{112.0 \text{ mi / hr}}$		