Please return to *Unit 1 Measurement Lesson 1.4* in the *Module* to continue your exploration.

## Lesson 1.4: The Imperial System

### Practice – V

1. Convert 77 yd 2 ft to feet.

$$77 \text{ yd} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 231 \text{ ft}$$

$$77 \text{ yd } 2 \text{ ft} = 231 \text{ ft} + 2 \text{ ft}$$
$$= 233 \text{ ft}$$

2. Convert 50 oz to pounds. Leave your final answer as a mixed fraction.

$$50 \text{ oz} \cdot \frac{1 \text{ lb}}{16 \text{ oz}} = \frac{50}{16} \text{ lbs}$$
$$= 3\frac{2}{16} \text{ lbs}$$
$$= 3\frac{1}{8} \text{ lbs}$$

Please complete *Lesson 1.4 Explore Your Understanding Assignment* located in *Workbook 1.4* before proceeding to *Lesson 1.5*.

## Lesson 1.5: Conversions Between the SI and Imperial System

### Practice – VI

1. Why are there two conversion ratios listed for each pair of measurements listed in the conversion table in *Lesson 1.5*?

When one of the values in a conversion ratio is 1, the conversion simplifies to a straightforward multiplication or division. By carefully selecting the most helpful of the two conversion ratios, you can always use multiplication.

2. Complete the following conversions.

   a. 10 m to yd

$$\frac{x}{10\text{ m}} = \frac{1.094\text{ yd}}{1\text{ m}}$$

$$\frac{x}{10\text{ m}} \cdot 10\text{ m} = \frac{1.094\text{ yd}}{1\text{ m}} \cdot 10\text{ m}$$

$$x = 10.94\text{ yd}$$

   b. 159 lbs to kg

$$159\text{ lbs} \cdot \frac{0.454\text{ kg}}{1\text{ lb}} = 72.186\text{ kg}$$

   c. 34 miles per hour to kilometres per hour

$$\frac{34\text{ mi}}{1\text{ h}} \times \frac{1.609\text{ km}}{1\text{ mi}} = 54.706\text{ km/h}$$

3. The diagram shows a thermometer with both Celsius and Fahrenheit scales.

   a. Describe how a thermometer with both scales can be used to convert between °C and °F.

   The corresponding measurements line up, so you can simply look across from the measure of interest to find its corresponding value in the other system.

   b. Use your strategy to convert

   i. 50°C to °F

   122˚F

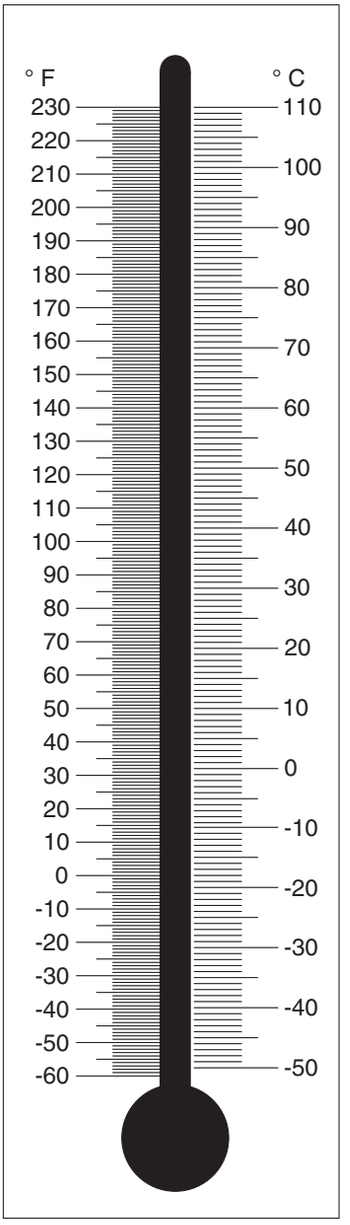
   ii. –10°F to °C

   −23˚C

   c. So far in this *Unit* you have always been able to use a proportion to convert between units. Explain why you cannot use the same strategy to convert between Celsius and Fahrenheit.
   (Hint: Zero will be important to your explanation.)

   For all the unit conversions completed so far, the value 0 has been the same on both scales (when you have 0 of one unit, you also have 0 of another). This means the two units are directly proportional – that is, if you double one value the other will also double, etc. This direct proportionally allowed you to set up and solve a proportion to convert between units.

   The 0 for Fahrenheit does not correspond to the 0 for Celsius, and vice versa. You cannot use a proportion on its own to convert between the two values because the units are not directly proportional.

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4. You are considering purchasing one of two used vehicles. Online, you have found that one vehicle has a fuel economy of 36 mi/gal and the other has a fuel economy of 7.2 L/100 km. Assuming imperial gallons were used, which of the two vehicles is more fuel efficient? Be sure to explain your reasoning.

   The rate 36 mi/gal can also be written as $\frac{1 \text{ gal}}{36 \text{ mi}}$ and can be converted to litres per kilometre as follows.

   $$\frac{1 \text{ gal}}{36 \text{ mi}} \cdot \frac{4.546 \text{ L}}{1 \text{ gal}} \cdot \frac{0.621 \text{ mi}}{1 \text{ km}} \doteq \frac{0.0784 \text{ L}}{1 \text{ km}}$$

   $$\frac{0.0784 \text{ L}}{1 \text{ km}} = \frac{x}{100 \text{ km}}$$
   $$\frac{0.0784 \text{ L}}{1 \text{ km}} \cdot 100 \text{ km} = \frac{x}{100 \text{ km}} \cdot 100 \text{ km}$$
   $$7.84 \text{ L} = x$$

   The fuel rate is approximately 7.84 L/100 km for the first vehicle. The second vehicle uses less fuel at 7.2 L/100 km.

Please complete *Lesson 1.5 Explore Your Understanding Assignment*, located in *Workbook 1.5*.