

# 2.6

## Expressing Imperial Units as SI

### Try These

Use mental math to calculate.

i)  $\frac{3}{5} = \frac{\boxed{12}}{20}$

$\times 4$

ii)  $\frac{2.54}{1} = \frac{\boxed{25.4}}{10}$

$\times 10$

iii)  $\frac{9}{15} = \frac{\boxed{6}}{10}$

$\div 1.5$   
 $\frac{3}{5} = \frac{6}{10}$

iv)  $\frac{35}{14} = \frac{\boxed{5}}{2}$

$\div 7$

You often need to express a length measured in imperial units in SI units. Look at a tape measure that shows both measurement systems.

- ① About how many centimetres are there in an inch?

$$1 \text{ in.} \doteq \underline{2.5} \text{ cm}$$

- ② About how many centimetres are there in a foot?

$$1 \text{ ft} \doteq \underline{30} \text{ cm}$$

- ③ About how many centimetres are there in a yard?

$$1 \text{ yd} \doteq \underline{90} \text{ cm}$$

### Example 1

A soccer goal is 24 ft wide. About how wide is it in metres?

#### Solution

- A. About how many centimetres are there in 24 feet?

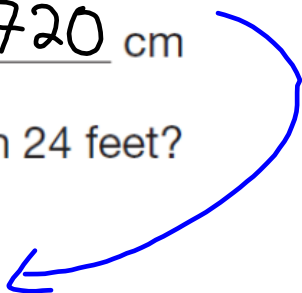
$$1 \text{ ft} \doteq \underline{30} \text{ cm}$$

$$24 \text{ ft} \times \underline{30} \text{ cm/ft} \doteq \underline{720} \text{ cm}$$

- B. About many metres are in 24 feet?

$$1 \text{ m} = 100 \text{ cm, so}$$

$$24 \text{ feet} \doteq \underline{7.2} \text{ m}$$

$$\div 100$$


When you need to know more precise values, you can use the relationships among common units. The degree of precision you use will depend on the situation.

Imperial to SI	
1 in.	$\doteq$ 2.54 cm
1 ft	$\doteq$ 0.31 m
1 yd	$\doteq$ 0.91 m
1 mi	$\doteq$ 1.61 km

### Example 2

Alfonso drove his truck from Edmonton to Regina, a distance of 436 miles. What is this distance in kilometres?

#### Solution 1

How far did Alfonso drive in kilometres?

$$1 \text{ mi} \doteq 1.61 \text{ km}$$

$$436 \text{ mi} \times \underline{1.61} \text{ km/mi}$$
$$= \underline{701.96} \text{ km}$$

## Example 2

Alfonso drove his truck from Edmonton to Regina, a distance of 436 miles. What is this distance in kilometres?

### Solution 2

Set up equivalent ratios to relate the units. Then solve the equation.

$$\frac{1.61 \text{ km}}{1 \text{ mi}} = \frac{? \text{ km}}{436 \text{ mi}}$$
$$? \doteq \frac{1.61 \text{ km}}{1 \text{ mi}} \times \underline{436}$$
$$? \doteq \underline{701.96} \text{ km}$$

## Example 3

Andrea's height is 5' 7". What is her height in centimetres?

### Solution 1

A. What is Andrea's height in inches?

$$1 \text{ ft} = 12 \text{ in.}, \text{ so } 5 \text{ ft} \times 12 \text{ in./ft} + \underline{7} \text{ in.} = \underline{67} \text{ in.}$$

B. What is Andrea's height in centimetres?

$$\underline{67} \text{ in.} \times \underline{2.54} \text{ cm/in.} \doteq \underline{170.18} \text{ cm}$$

Andrea is about 170 cm tall.

**Solution 2**

A. What is Andrea's height in inches? 67 in.

B. Set up equivalent ratios and solve the equation.

$$\frac{2.54 \text{ cm}}{1 \text{ in.}} = \frac{? \text{ cm}}{\boxed{67} \text{ in.}}$$

$$? \doteq \frac{2.54 \text{ cm}}{1 \text{ in.}} \times \underline{67} \text{ in.} \doteq \underline{170.18} \text{ cm}$$

$$? \doteq \underline{170.18} \text{ cm}$$

Andrea is about 170 cm tall.

**Practice: Pg 56 # 1 - 10**