

Unit 1 Lesson 1 - Imperial Measurement

Although there have been many systems of measurement used over time, there are two that have emerged which the world has accepted and adopted. They are the Imperial or British (Standard) System and the Metric or International System of Units (SI for short). Most of the scientific community of the world uses SI units while the construction industry of North America largely uses the Imperial System. Even though the Metric System has been introduced to Canada in 1976, most of you still know your weight in pounds, not in kilograms. Since so much trade is exchanged between our countries, many of our products are made in Imperial units to suit the powerful US economy that drives our economy.

A. Referents for Measurement Systems

In measurement a referent is a **concrete object that approximates a measurement**. Some common referents are given in the table below for the Imperial system although a referent can be almost anything that is useful.

Unit	Abbr	Referent
inch	in	Thumb length
foot	ft	Foot length
yard	yd	Arm span
mile	mi	Distance walked in 20 minutes
cubit	cu	Distance from elbow to finger tip
fathom	fa	Distance between the fingertips of a man's outstretched arms
furlong	fl	The distance a team of oxen could plow a field before it had to rest (furrow long)

As long as there has been trade going on between people there has been a need for measuring devices which trades people made themselves. However, it was not long before these measuring devices and the units themselves were standardized with relationships between units established.

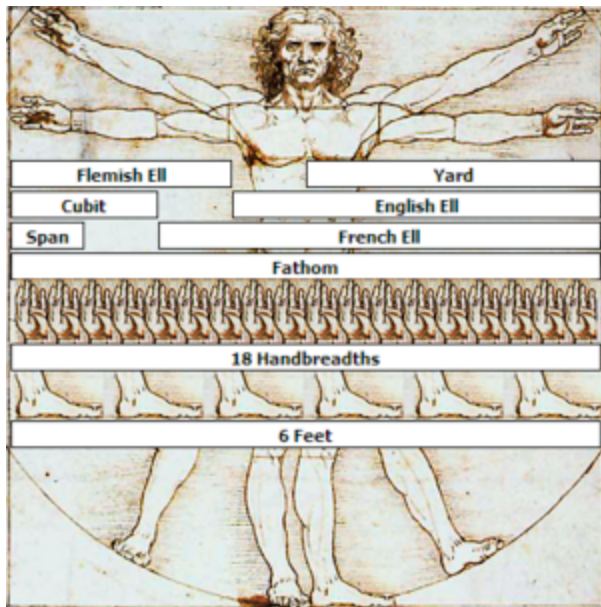
1 ft = 12 inches

1 yd = 3 ft

1 mi = 1760 yd or 5280 ft

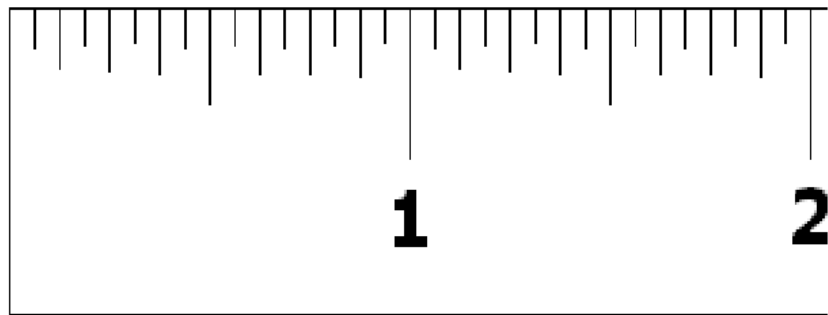
N.B. The symbol for inch is "

The symbol for ft is '

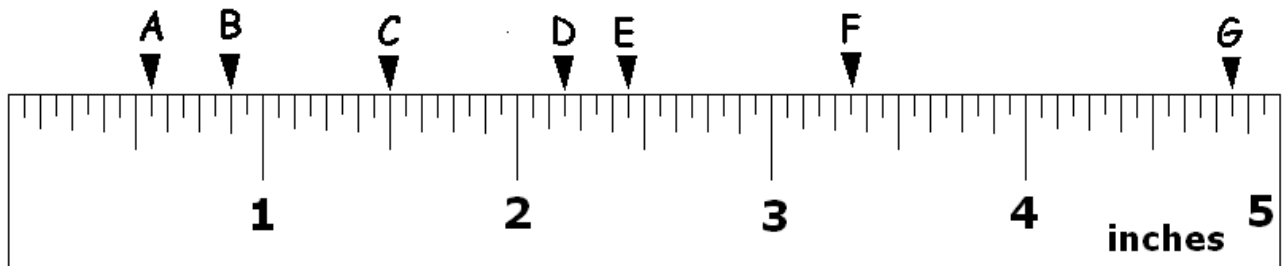


B. Imperial Measurement

Here is an enlarged section of an Imperial ruler:



How many divisions are there between each inch? _____



Write the measurement in inches indicated by the following arrows to the nearest sixteenth of an inch.

A _____ B _____ C _____ D _____ E _____ F _____ G _____

C. Conversion within the Imperial System - Proportional Reasoning

Convert 7 yd to i) ft ii) in

i) Since 1 yd = 3 ft, we must multiply 7 yd by 3 to get ft

$$7 \text{ yd} = 7 (3 \text{ ft})$$

$$7 \text{ yd} = 21 \text{ ft}$$

ii) Since 7 yd = 21 ft and 1 ft = 12 inch, we must multiply 21 by 12.

$$7 \text{ yd} = 21 (12 \text{ in})$$

$$7 \text{ yd} = 252 \text{ in}$$

Convert 62 in to i) ft and in ii) yd, ft and in

i) Since 12 in = 1 ft we must divide 62 in by 12 to get ft

$$62 \text{ in} = \frac{62}{12} \text{ ft}$$

$$62 \text{ in} = 5 \frac{2}{12} \text{ ft}$$

$$62 \text{ in} = 5 \text{ ft } 2 \text{ in}$$

ii) Since 3 ft = 1 yd we must divide 5 ft by 3 to get yd

$$5 \text{ ft} = \frac{5}{3} \text{ yd}$$

$$5 \text{ ft} = 1 \text{ yd } 2 \text{ ft}$$

$$62 \text{ in} = 1 \text{ yd } 2 \text{ ft } 2 \text{ in}$$

D. Solving Problems Involving Conversion

George buys baseboard for his bedroom that has a perimeter of 37 ft. What is the length in yards and feet? If baseboard costs \$5.99/yd what is the cost of material before taxes?

$$37 \text{ ft} = \frac{37}{3} \text{ yd}$$

$$37 \text{ ft} = 12 \text{ yd } 1 \text{ ft}$$

Since 13 yd must be bought the the cost :

$$C = 13 \text{ yd} \left(\frac{\$5.99}{\text{yd}} \right)$$

$$C = \$77.87$$

E. Scale Diagrams

A map has a scale of 1:4 750 000 with a distance of $3\frac{11}{16}$ in between Seward and Anchorage on the map. What is the actual distance between these two locations to the nearest mile?

Since real life is 4 750 000 times larger than the map, you must multiply $3\frac{11}{16}$ by the scale factor. Then convert to miles.

$$3\frac{11}{16} \text{ in} (4\,750\,000) = 17\,515\,625 \text{ in}$$

Divide by 12 to obtain ft.

$$17\,515\,625 \text{ in} = \frac{17\,515\,625}{12} \text{ ft}$$

$$17\,515\,625 \text{ in} = 1\,459\,635.417 \text{ ft}$$

Divide by 5280 to obtain miles

$$1\,459\,635.417 \text{ ft} = \frac{1\,459\,635.417}{5280} \text{ mi}$$

$$1\,459\,635.417 \text{ ft} = 276.446 \dots \text{mi}$$

The distance between Seward and Anchorage is 276 miles.