

Using Imperial and Metric Rulers

We have probably all heard the old saying: “Measure twice; cut once.” Using a ruler efficiently to measure materials and construction is an essential aspect of carpentry.

In the previous sections, you have already studied both metric and imperial measurement. In this section, you will put that information into practical use for carpentry. Many trades use both imperial and metric systems of measurement, so you need to know how to read and use both types of rulers and tapes. Often both systems are on the same ruler / tape. This is convenient, but beware of reading the numbers for one system and using the units of measurement for the other.

An Imperial ruler, usually 1 foot (*ft* or *'*) long, is divided into inches (*"*) and parts of inches. An Imperial tape is similarly divided, but is much longer. Many Imperial measures of length divide inches into halves, quarters, eighths, sixteenths - and even thirty-secondths.

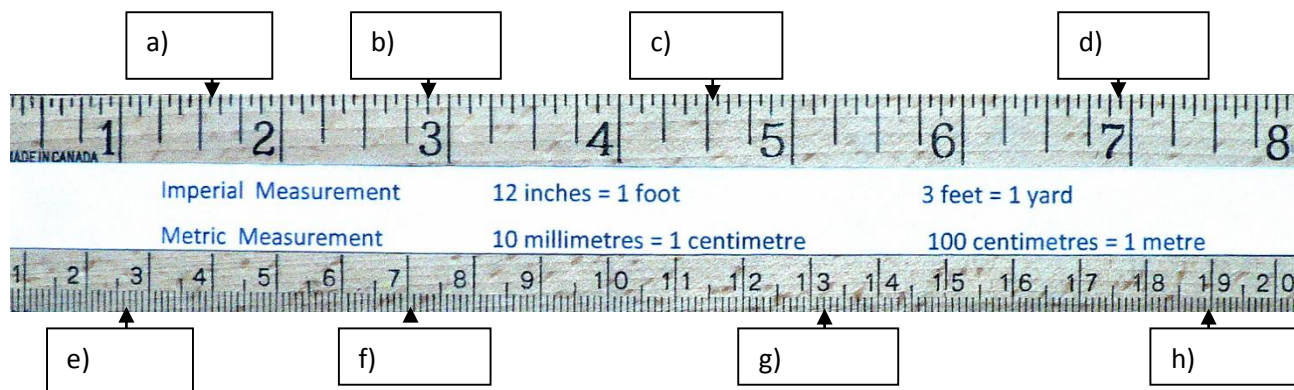
Metric measures are divided into multiples of 10, starting with millimetres (*mms*) and centimetres (*cms*). A 1 metre (*m*) rule is divided into 100 centimetres or 1 000 millimetres.

*On your carpentry assessment, you will **not** be given how many inches are in a foot, millimetres and centimetres in a metre, so you need to know those.*

Here is a quick review of past learning, plus an exercise, using that knowledge, with a ruler and a tape.

Practice Exercise

- How many of these fractions of an inch are there in one inch?
 - quarters
 - sixteenths
 - halves
 - eighths
- Find the answers to how many
 - cms in 3 m
 - mms in 55 cms
 - mms in 2 m 5 cms
 - cms in 350 mms
- In the boxes below, label the measurements shown on the ruler. Write both numbers and units of *either* inches (*ins* or *"*) *or* millimetres / centimetres (*mms* / *cms*), whichever is appropriate.

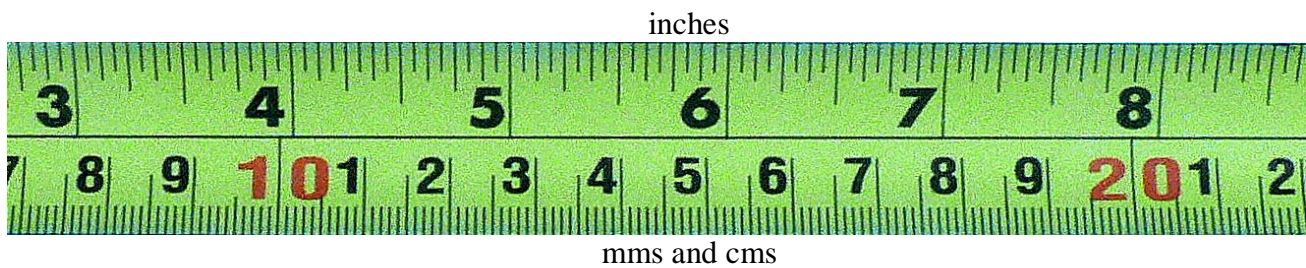


Practice Exercise Answers

- 1 a) 4 b) 16 c) 2 d) 8
- 2 a) 300 cms b) 550 mms c) 2050 mms d) 35 cms
- 3 a) = $1 \frac{9}{16}$ " b) = $2 \frac{14}{16}$ " = $2 \frac{7}{8}$ " c) = $4 \frac{1}{2}$ " d) = $6 \frac{15}{16}$ "
- e) = 2.6 cms f) = 7 cms g) = 13.2 cms h) = 18.9 cms
- or 26 mms or 132 mms or 189 mms

Exercise

- 1 Label this tape with the measurement points below. Use an arrow and the letter of the measurement point to show your accurate reading.



- a) $3 \frac{1}{2}$ " b) 11 cms c) $5 \frac{3}{8}$ " d) 100 mms e) $4 \frac{5}{16}$ "
- f) 16.6 cms g) 21.5 cms h) $7 \frac{1}{16}$ " i) $8 \frac{1}{4}$ " j) 18 cm 5 mm

- 2 Convert these fractions of inches into sixteenths. Use a ruler or tape to help you.

- a) $\frac{3}{8}$ " b) $\frac{3}{4}$ " c) $\frac{1}{2}$ " d) $1 \frac{1}{4}$ " e) $\frac{7}{8}$ " f) $1 \frac{5}{8}$ "

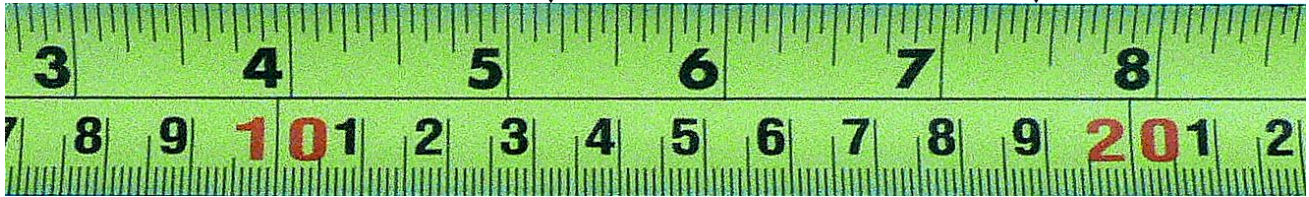
- 3 Convert the fractions below into equivalent fractions. You are given the denominators. All can be read as simple fractions [e.g. the questions below] *or* as fractions of an inch [e.g. the answers at the end]. If you are working with measurement, the units of inch/inches are often understood.

You can see that metric measurement does not have fractions; it uses decimals to show parts.

- a) $\frac{7}{16} = \frac{\quad}{32}$ b) $\frac{2}{8} = \frac{\quad}{4} = \frac{\quad}{16}$ c) $1 \frac{1}{2} = \frac{\quad}{8}$ d) $\frac{5}{8} = \frac{\quad}{32}$ e) $\frac{10}{16} = \frac{\quad}{8}$ f) $\frac{3}{4} = \frac{\quad}{16}$

- 4 Follow this example to see how to add one measurement to another. Then do the problems below.
 e.g. a) Add $2\frac{1}{4}$ to $5\frac{3}{16}$. [*Hint: change fractions into equivalent forms e.g. $\frac{1}{4} = \frac{4}{16}$.*]

$$5\frac{3}{16} + 2'' + \frac{4}{16} = 7\frac{7}{16}$$



$$(8.5\text{ cms}) + 5.5\text{ cms} = (14\text{ cms})$$

- b) Add 5.5 cms to 85 mms. (*Change both measurements to the same unit before adding: 85 mms = 8.5 cms.*)

Now try these by following the same method and similar marking:

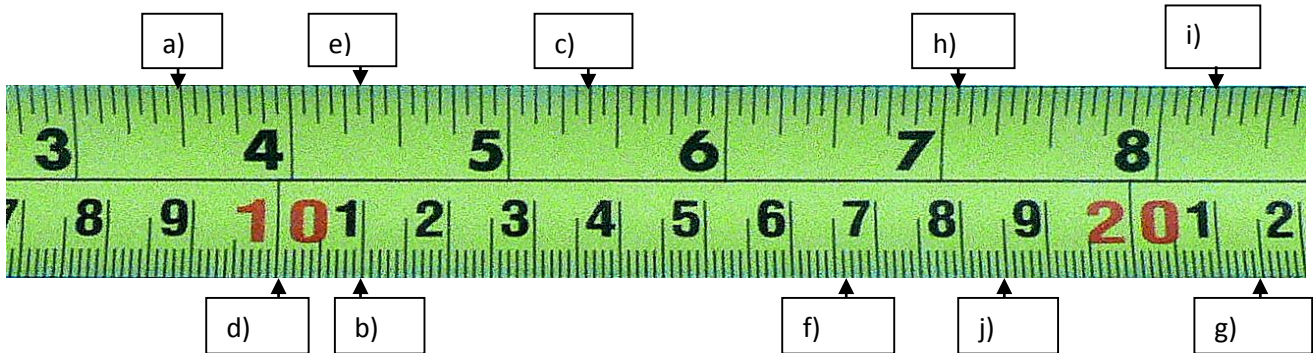
- c) Add $3\frac{5}{16}$ to $4\frac{1}{8}$



- d) Take / Subtract 4.5 cms from 212 mms. [*Hint: what do you need to do with cms or mms?*]

Exercise Answers:

1)



2 a) $\frac{6''}{16}$

b) $\frac{12''}{16}$

c) $\frac{8''}{16}$

d) $\frac{20''}{16}$

e) $\frac{14''}{16}$

f) $\frac{26''}{16}$

3 a) $\frac{14''}{32}$

b) $\frac{1''}{4} = \frac{4''}{16}$

c) $\frac{12''}{8}$

d) $\frac{20''}{32}$

e) $\frac{5''}{8}$

f) $\frac{12''}{16}$

4 c) $4\frac{1''}{8} + 3\frac{5''}{16} = 4\frac{2''}{16} + 3\frac{5''}{16} = 7\frac{7''}{16}$

d) $212\text{ mms} = 21.2\text{ cms} - 4.5\text{ cms} = 16.7\text{ cms}$

or $212\text{mms} - 45\text{ mms} = 167\text{ mms}$