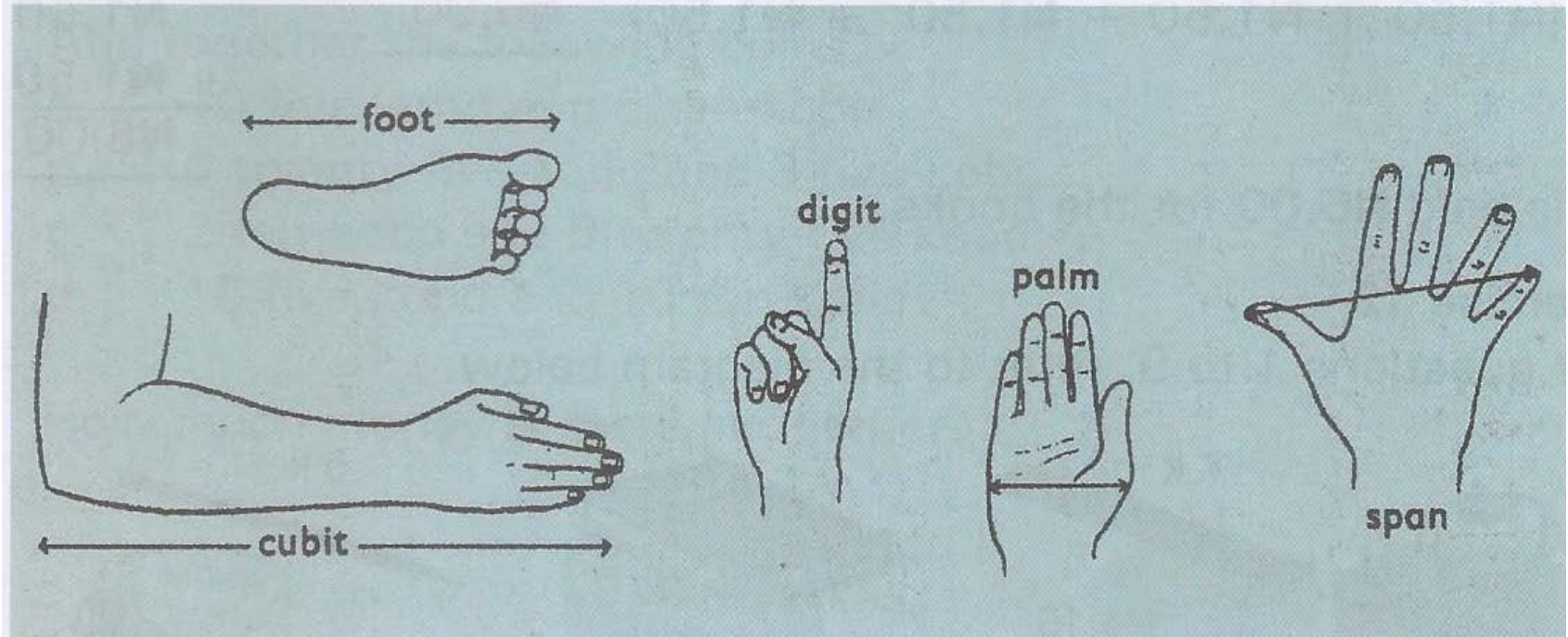# MEASUREMENT (LENGTH)
Units for measuring length

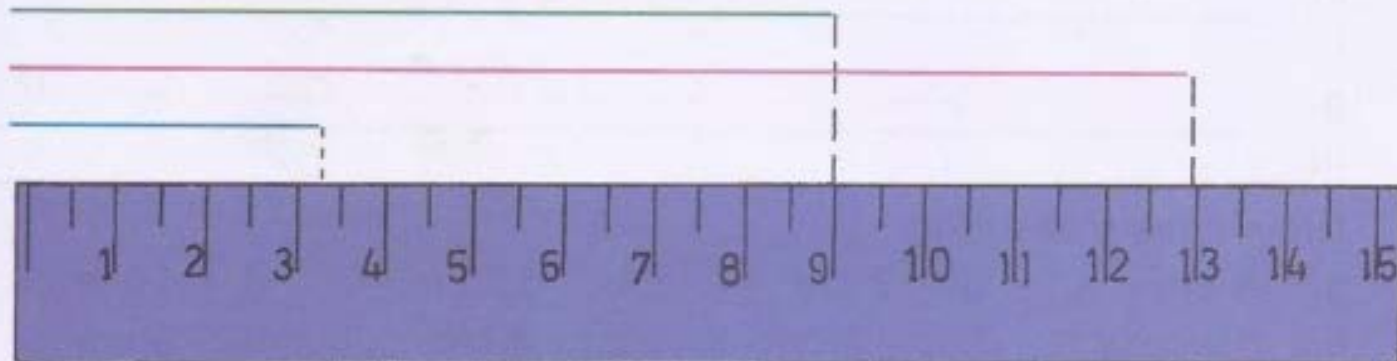Long ago, parts of the body were used to measure lengths. Here are some of the units.

We cannot use the span to measure lengths because each person may get a different answer. Nowadays in most countries of the world, we use the **centimetre** and the **metre** for measuring length. These are the common units of length. These units never change and are the same everywhere. We say they are constant.

Centimetres and metres

Look at this line AB: A ____ B
This is the length of 1 centimetre.
The centimetre is written **cm** for short.

Look at the blue line.
Its length is more than 3 cm but less than 4 cm.
It is nearer to 3 cm than 4 cm.
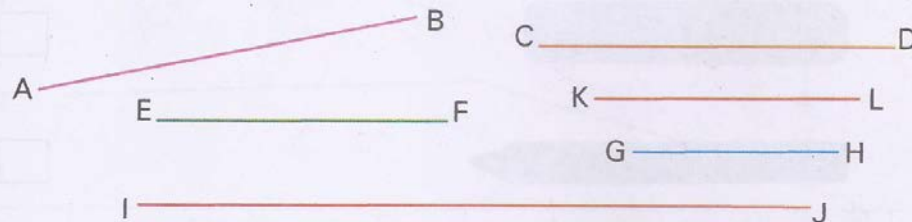We say that the blue line is about 3 cm.
We can also say that the length of the blue line is 3 cm, to the nearest centimetre.
The length of the red line is ____ cm, to the nearest centimetre.
The length of the green line is ____ cm, to the nearest centimetre.
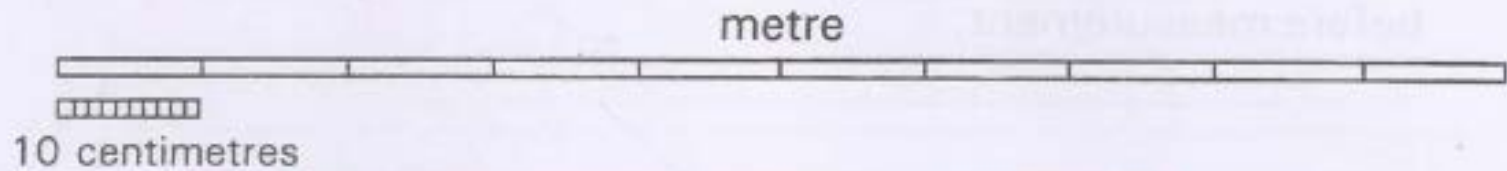
Exercise 1

1. Measure the lengths of the following lines, to the nearest cm.

Activity 2

Use a centimetre ruler to find how many centimetres there are in a metre.

metre

10 centimetres

| 1 metre (m) = 100 centimetres (cm) |

Conversion of centimetres to metres and metres to centimetres

| 1 metre = 100 centimetres |

Example 1: Change 170 cm into metres and centimetres.

$$170 \text{ cm} = 100 \text{ cm} + 70 \text{ cm}$$
$$= 1 \text{ m} + 70 \text{ cm}$$
$$= 1 \text{ m } 70 \text{ cm}$$

LEARN THIS TABLE

10 millimetre	= 1 centimetre
100 cm	= 1 metre
1000 m	= 1 kilometre

Example 2: Change 2 m 59 cm into centimetres.

$$2 \text{ m } 59 \text{ cm} = 200 \text{ cm} + 59 \text{ cm}$$
$$= 259 \text{ cm}$$

Adding metres and centimetres

Look at these examples.

Example 1
Add 70 cm and 50 cm.

$$70 \text{ cm} + 50 \text{ cm}$$
$$= 100 \text{ cm} + 20 \text{ cm}$$
$$= 1 \text{ m } 20 \text{ cm}$$

Example 2
Add 2 m 29 cm and 1 m 32 cm.

$$\begin{array}{r} 2 \text{ m } 29 \text{ cm} \\ + \ 1 \text{ m } 32 \text{ cm} \\ \hline 3 \text{ m } 61 \text{ cm} \end{array}$$

Example 3
Add 3 m 56 cm and 5 m 85 cm.

$$\begin{array}{r} \overset{1}{} \ 3 \text{ m} \quad \overset{1}{56} \text{ cm} \\ + \ 5 \text{ m} \quad 85 \text{ cm} \\ \hline 9 \text{ m} \quad 41 \text{ cm} \end{array}$$

56 cm + 85 cm = 100 cm + 41 cm
= 1 m + 41 cm

Subtracting metres and centimetres

Look at these examples.

Example 1
Subtract 1m 25 cm from 2 m 58 cm.

$$
\begin{array}{r}
2\text{ m } 58\text{ cm} \\
-\ 1\text{ m } 25\text{ cm} \\
\hline
1\text{ m } 33\text{ cm} \\
\hline
\end{array}
$$

Example 2
Subtract 1m 18 cm from 3 m 65 cm.

$$
\begin{array}{r}
3\text{ m } 65\text{ cm} \\
-\ 1\text{ m } 18\text{ cm} \\
\hline
2\text{ m } 47\text{ cm} \\
\hline
\end{array}
$$

Example 3
Subtract 3m 74 cm from 5m 65 cm.

$$
\begin{array}{r}
\overset{4}{5}\text{ m } \overset{165}{65}\text{ cm} \\
-\ 3\text{ m } 74\text{ cm} \\
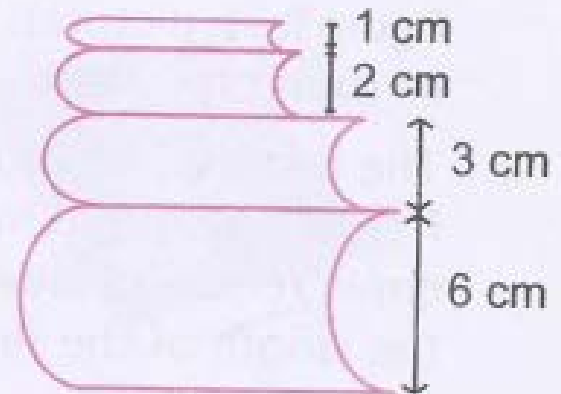\hline
1\text{ m } 91\text{ cm} \\
\hline
\end{array}
$$

We cannot subtract 74 cm from 65 cm.
We change 5m 65 cm to 4 m 165 cm.

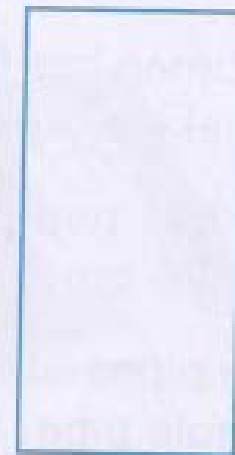# Addition and subtraction problems on length

Look at these examples.

Example 1: A number of books were placed on top of each other. The thickness of each book is shown in the picture. What is the total thickness of all the books?

Total thickness of all the books is
$$= (1 + 2 + 3 + 6) \text{ cm} = 12 \text{ cm}$$

1 cm
2 cm
3 cm
6 cm

Example 2: The length of a fence all round a garden and the gate is 20 m. The length of the gate is 2 m. What is the length of the fence?

Length of fence and gate is 20 m.
Length of gate is 2 m.
Length of fence alone is
$(20-2) \text{ m} = 18 \text{ m}$

Example 3: A woman used 5 m 65 cm of green ribbon and 8 m 86 cm of red ribbon for tying up presents. How much ribbon did she use altogether?

A woman used   5 m 65 cm of green ribbon

and   +   8 m 86 cm of red ribbon.

Altogether she used   14 m 51 cm   of ribbon.

Example 4: A man is 1 m 85 cm tall. His son is 98 cm tall. How much taller than the son is the father?

The father is   1 m 85 cm tall.

His son is   —   98 cm tall.

The father is   87 cm   taller than his son.