

SECTION 2: Map Scale

One of the most important characteristics of a map is that it enables the reader to measure distances between mapped features. However, maps are necessarily smaller than the areas they represent and must state the ratio between comparable distances on the map and the ground to enable accurate measurements to be made. This ratio is known as the 'map scale'.

The map scale is therefore commonly thought of as being the ratio between a distance on the map and the corresponding distance between the same two points on the ground, with the distance on the map always expressed as one.

Effective map use is impossible without a proper understanding of scale. Map scale not only provides you with knowledge of distances between objects on the ground but it is a prime factor in assisting you to appreciate the relative position of mapped features and thus build a mental picture of a mapped area. It is this pre-knowledge of an area which enables you to move with confidence from one location to another.

Map scale can be expressed in the following ways:

- scale statement
- graphic or bar scale
- representative fraction

SCALE STATEMENT

On many maps the scale is described in words and numbers. For example 1 centimetre equals 100 kilometres or, as often found, 1 centimetre to 100 kilometres. This means that 1 centimetre on the map represents 100 kilometres on the earth's surface.

Figure 1.1 gives some examples of scale statements.

GRAPHIC OR BAR SCALE

This is a line or parallel lines placed between points on the map to enable distances between points on the map to be compared with the ground distances they represent. Such a scale is usually marked in units of measurement such as 10s of metres. The left-hand end of the scale may be marked with a zero to enable distances to be measured more precisely.

Figure 1.2 includes some different kinds of graphic scale. A graphic scale is divided into major units only for ease of recognition.

REPRESENTATIVE FRACTION

Map scale is commonly expressed as a representative fraction (RF) in which map distances are expressed as a fraction of ground distances. For example 1:10 000. This means that 1 mm or 10 000 cm respectively on the earth's surface is 10 000 times smaller than that part of the earth's surface. An RF scale of 1:1000.

Figure 1.3 gives some examples of RF scales.

You will find that most of the maps use a ruler to help you to use a bar scale. Place the end of the ruler on the first point. Then with your index finger on the ruler bring the ruler to the second point. The distance between the two points on the ruler will be the distance between the two points on the map.

GRAPHIC OR BAR SCALE

This is a line or parallel lines placed on a map, usually near the margin, to enable distances between points on the map to be measured directly in the ground distances they represent. Such scales are subdivided into convenient units of measurement such as 10s or 100s of metres or kilometres. The left-hand end of the scale may be subdivided further so that distances can be measured more precisely.

Figure 1.2 includes some different kinds of bar scales. Note that the third bar scale is divided into major units only, with every second unit infilled for easy recognition.

REPRESENTATIVE FRACTION

Map scale is commonly expressed as a 'representative fraction' (RF for short), in which map distances are expressed as ratios of real distances, for example 1:10 000. This means that 1 mm or 1 cm on the map represents 10 000 mm or 10 000 cm respectively on the earth's surface. Stated another way, a map drawn 1000 times smaller than that part of the earth's surface it represents would have an RF scale of 1:1000.

Figure 1.3 gives some examples of RF scales.

You will find that most of the maps you wish to use will have bar scales. A ruler will help you to use a bar scale to measure the distance between two points. Place the end of the ruler on the first point and with one of your fingers mark the position of the second point on the ruler. Then, without moving the finger on the ruler bring the ruler to the bar scale and read off the distance.

FIGURE 1 MAP SCALE

Figure 1.1
Scale statement

1 centimetre equals 1250 metres
 One centimetre to twelve hundred and fifty metres
 1 centimetre equals 25 kilometres
 1 centimetre to 300 kilometres

Figure 1.2
Graphic or bar scale

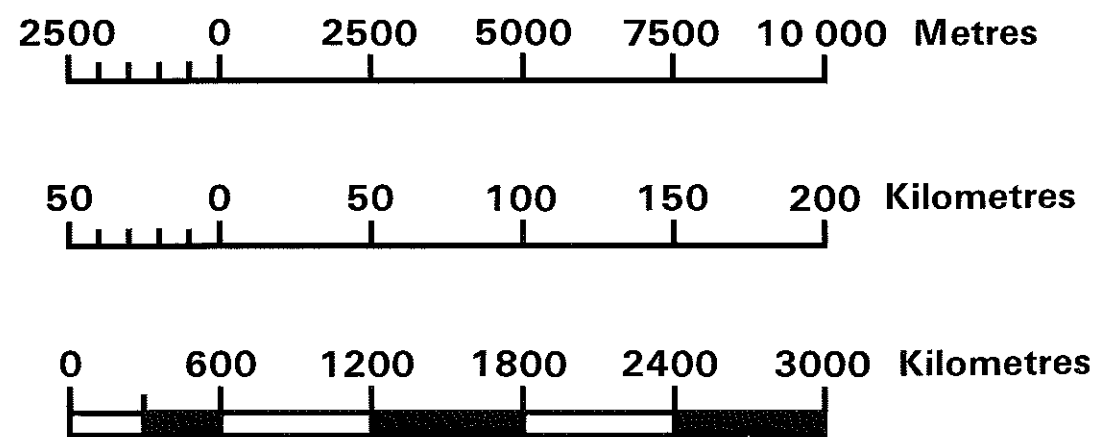


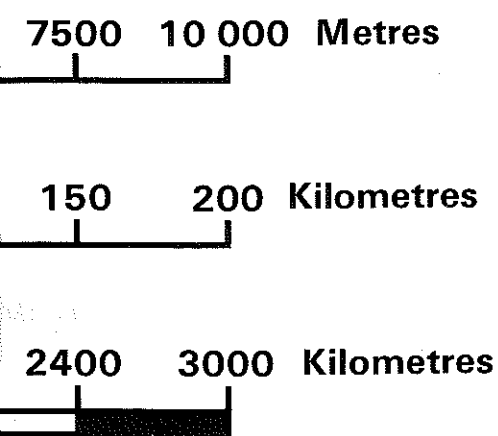
Figure 1.3
Representative fraction (RF)

1:1250 (1 unit on the map represents 1250 units on the ground)
 1:25 000 (1 unit on the map represents 25 000 units on the ground)
 1:30 000 000 (1 unit on the map represents 30 000 000 units on the ground)

Your thumb and forefinger can also measure two points. However, both of these are less accurate measurements. A more accurate method is to use 'dividers' to obtain the length between two points. Did you notice that the same three scales (1:1250, 1:25 000, 1:30 000 000)—were represented in the same way? Maps can be drawn at many different scales. 'large scale' maps are often used. One way to compare you have two maps covering exactly the same area at different scales. The larger scale map will cover a smaller area. Conversely, if you have two maps of the same area, the larger scale map will cover a smaller area than the smaller scale map. Examples of small scale maps are the maps of Australia at 1:20 000 000 and the map 'Urbanville Town Centre' at 1:10 000.

FIGURE 1 MAP SCALE

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p represents 1250 units on the ground)

p represents 25 000 units on the ground)

p represents 30 000 000 units on the ground)

Your thumb and forefinger can also be used to measure the distance between two points. However, both of these methods will only give approximate measurements. A more accurate measurement can be achieved by using 'dividers' to obtain the length between selected points.

Did you notice that the same three scales—1:1250, 1:25 000 and 1:30 000 000—were represented in three different ways in Figure 1?

Maps can be drawn at many different scales and the terms 'small scale' and 'large scale' are often used. One way to explain these terms is to imagine that you have two maps covering exactly the same area of the earth's surface but at different scales. The larger scale map will be larger than the small scale map. Conversely, if you have two maps of the same size but at different scales the larger scale map will cover a smaller area of the earth's surface than the smaller scale map. Examples of small scale maps found in this *User Guide* are the maps of Australia at 1:20 000 000, 1:22 000 000 and 1:30 000 000, whereas the map 'Urbanville Town Centre' at 1:1250 is a large scale map.