SCALES

Scale of map: is the fixed relation that every distance on the map to the corresponding distance on the ground.

»» Scale = distance on the map/the corresponding distance on the ground.

$$\text{»»Scale} = \sqrt{\frac{\text{aera on the map}}{\text{area on the ground}}}$$

Type of scale:

1. **Numerical scale:** one unit of length on the drawing represents a stated number of the same units of length on the ground as 1/5000 .

2. Second type is called the *engineer's scale,* as 1cm: 20m.

3. **A graphical scale:** is a line subdivided into map distances corresponding to convenient units of length on the ground.

The Kinds of graphical scale:

a. Linear scale.

(1/5000)

b. Diagonal scale.

(1/500)
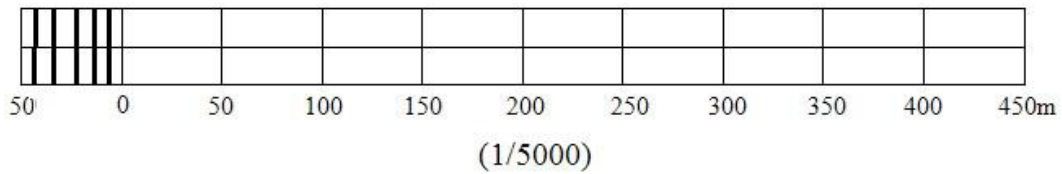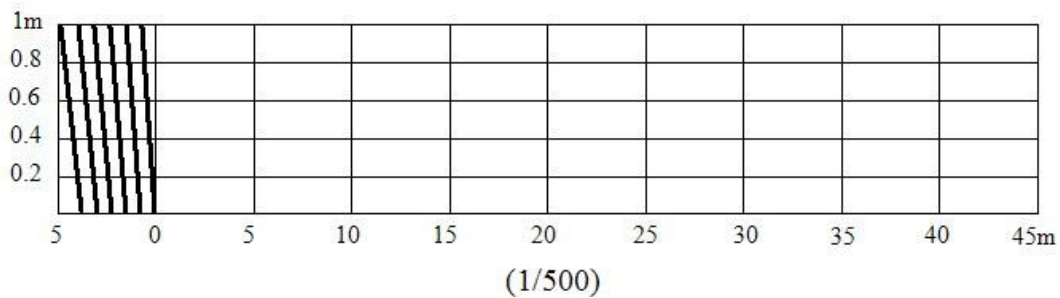
»» No. of divisions = direct reading/ required accuracy.

A graphical scale is the most accurate, because; the Numerical scale is subject to error if the drawing paper shrinks or swells.

The scale of map depends upon:

1. The purpose for which the map is required.

2. Drawing paper dimensions.

3. Accuracy required.

Example: _

The plan of a field of an area of 17.436 hectares covers 27900 mm² on paper. What is the scale?

Sol :-

1 hectare = 10000m²

17.436 *10000 =174360 m2

1m=1000mm

$1m^2=1000000mm^2$

$\frac{27900}{1000000}=0.0279m^2$

$$Scale = \sqrt{\frac{0,0279}{174360}} = \frac{1}{2500}$$

Example:

On a plan of scale 1 in 600, the distance between two points was measured and found to be 428m.It was after wards found that scale used was one of 1 in 500 what was the true length?

Sol :

1cm: 500cm: 5m

$\frac{1}{5} = \frac{x}{428}$; x=85.6 cm

1cm. : 600 cm : 6m

$\frac{1cm}{6m} = \frac{85.6cm}{x}$; x=513.6m

Example : −
An area Of rectangular shape land is (1100M * 1600M.). It is required to draw it on sheet of (50cm. *70cm.). What is the suitable scale?
sol: −

$$Scale = \sqrt{\frac{aera\ on\ the\ map}{area\ on\ the\ ground}}$$

$$= \sqrt{\frac{50*70}{1100*1600}} = \frac{1}{2242.44} \gg \frac{1}{2500}$$

Example:-

A line "AB" is appear on a map of unknown scale, it's length is (6.5cm), if the ground coordinate of A and B are (500m, 500m) & (700m, 243.8m) respectively. Calculate that unknown scale.
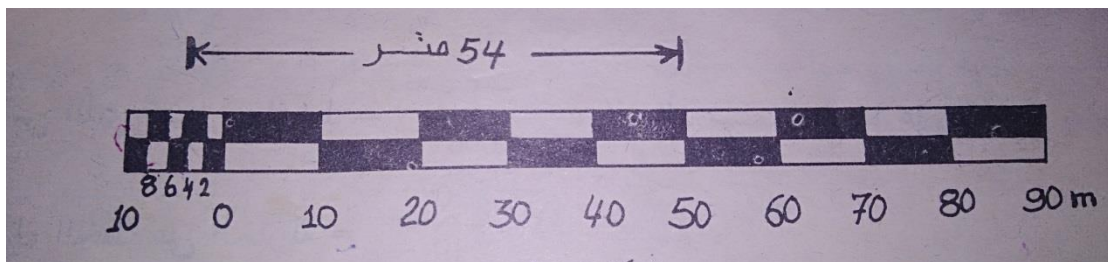
Solution:

The length of AB $= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

AB $= \sqrt{(700 - 500)^2 + (243.8 - 500)^2} = 325.02m.$

Scale $= 6.5cm / 325.02m = 1/ 5000.$

EX/ Draw graphical scale 1:1000 reads to 2 m and show on it distance (54 m)

EX/ Draw graphical scale 1:2000 reads to 1 m and show on it distances (87 m, 154 m)

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