DETERMINING THE SCALE OF A TOPOGRAPHIC MAP

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ABSTRACT: *The article shows all methods for determining the scale of a topographic map. the methods shown can be used when the scale is not displayed on the map.*

KEYWORDS: *scale, map, numerical scale, graphical expression.*

1. General considerations.

To be able to measure distances from the map and solve a number of practical tasks, we need to know its scale.

Scale of the map is called the ratio of the lengths of the lines of the map to the horizontal lengths of the same lines from the area:

$$(1) \qquad \frac{a}{A} = \frac{1}{M}$$

where: a - the measured distance from the map (recorded in meters), A - the same distance of the area; M - Scale.

On each map the scale is written under the southern frame in the middle of the card sheet and is expressed numerically and graphically (linear) Fig.1.

- a - basis of the linear scale - the largest division, expressed in centimeters;
- b - magnitude of the linear scale - the number of meters from the area corresponding to the base;
- in - linearity accuracy - the number of meters from the site corresponding to the smallest scale scale to the left of zero.

2. Determining the scale of the map.

If the scale of the card is missing or not specified, then it can be determined in one of the following ways:
- On the map nomenclature - Each scale has its strictly defined nomenclature - Table 1.

Table 1

Мащаб	Означение
1 : 1 000 000	К-34
1 : 500 000	К-34- А, Б, В, Г
1 : 200 000	К-34- I, II, ..., XXXVI
1 : 100 000	К-34- 1, 2, 3, ..., 144
1 : 50 000	К-34-45- А, Б, В, Г
1 : 25 000	К-34-45-Б- а, б, в, г
1 : 10 000	К-34-45-Б-б 1, 2, 3, 4
1 : 5 000	К-34-45 (1, 2, 3, ..., 256)
1 : 2 000	К-34-45 (235-а, б, в, ..., и)

- The kilometer (coordinate) network.
Example: The square of the grid is 4 cm and the gauge is passed through 2 mm. The scale is defined as follows:
4 cm of the map corresponds to 2000 meters from the area.
1m of the map corresponds to Xm from the area.

(2)
$$X = \frac{2000.1}{4} = 500m$$
$$M = 1:50000$$

- The milestones along the roads.
Example: The distance between two neighboring milestones on the map is 2 cm (Fig.4). What is the scale of the map?