

Problem

Convert the given Statement of Scale of 1 inch represents 4 miles into R. F.

Solution

The given Statement of Scale may be converted into R. F. using the following steps.

1 inch represents 4 miles

or

1 inch represents $4 \times 63,360$ inches (1 mile = 63,360 inches)

or

1 inch represents 253,440 inches

NOTE :

We can now replace the character “inches” into “units” and read it as :

1 unit represents 253,440 Units

Answer

R. F. 1 : 253, 440

Problem

Convert R. F. 1 : 253, 440 into Statement of Scale (In Metric System)

Solution

The given R. F. of 1 : 253, 440 may be converted into Statement of Scale using the following steps :

1 : 253, 440 means that

1 unit on the map represents 253, 440 units on the ground.

or 1 cm represents $253, 440/100,000$ (1 km = 100,000 cm)

or 1 cm represents 2.5344 km

After rounding of up to 2 decimals, the answer will be :

Answer 1 cm represents 2.53 km

Construction of the Graphical/Bar Scale

Problem 1 Construct a graphical scale for a map drawn at a scale of 1 : 50,000 and read the distances in kilometre and metre.

NOTE: By convention, a length of nearly 15 cm is taken to draw a graphical scale.

Calculations To get the length of line for the graphical scale, these steps may be followed:

1 : 50,000 means that

1 unit of the map represents 50,000 units on the ground

or 1 cm represents 50,000 cm

or 15 cm represents $50,000 \times 15/100,000$ km

or 15 cm represents 7.5 km

Since the value of 7.5 (km) is not a round number, we can choose 5 or 10 (km) as the round number. In the present case, we choose 5 as the round number.

To determine the length of the line to show 5 km, the following calculations are to be carried out:

7.5 km is represented by a line of 15 cm

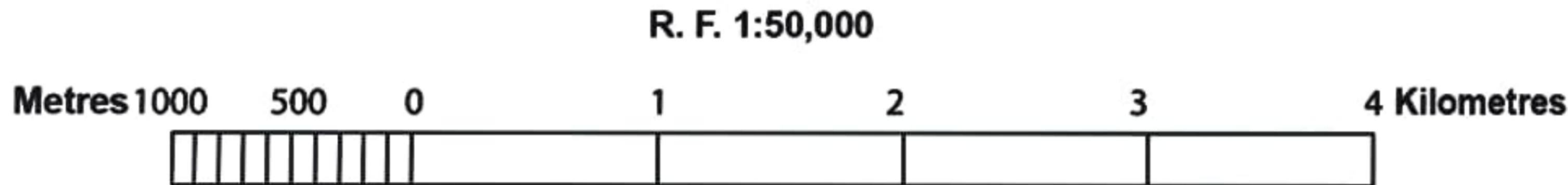
5 km will be represented by a line of $15 \times 5/7.5$

or 5 km will be represented by a line of 10 cm

Construction The graphical scale may be constructed by following these steps:

Draw a straight line of 10 cm and divide it into 5 equal parts and assign a value of 1 km each for 4 right side divisions from the 0 mark. Also

division by a value of 100 metres, beginning from 0. (You may also divide it into 2, 4, or 5 parts and assign a value of 500, 250, or 200 metres to



each of the subdivisions respectively from 0.

Figure 2.2

Construction of the Graphical/Bar Scale

Problem 1 Construct a graphical scale for a map drawn at a scale of 1 : 50,000 and read the distances in kilometre and metre.

NOTE: By convention, a length of nearly 15 cm is taken to draw a graphical scale.

Calculations To get the length of line for the graphical scale, these steps may be followed:

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1 unit of the map represents 50,000 units on the ground

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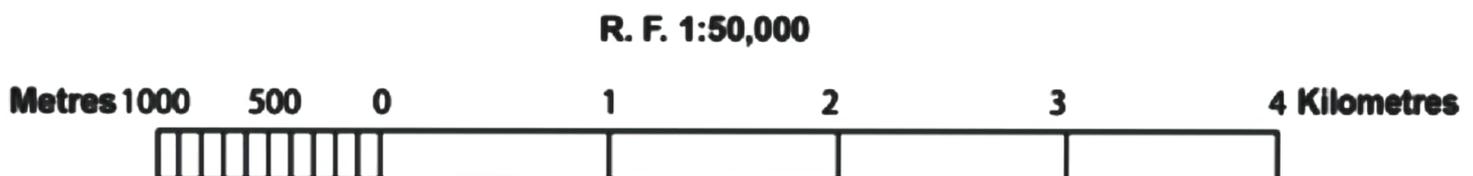
5 km will be represented by a line of $15 \times 5/7.5$

or 5 km will be represented by a line of 10 cm

Construction The graphical scale may be constructed by following these steps:

Draw a straight line of 10 cm and divide it into 5 equal parts and assign a value of 1 km each for 4 right side divisions from the 0 mark. Also

divide the extreme left side division into 10 equal parts and mark each division by a value of 100 metres, beginning from 0. (You may also divide it into 2, 4, or 5 parts and assign a value of 500, 250, or 200 metres to



each of the subdivisions respectively from 0.

Figure 2.2

Problem 2

Construct a graphical scale when the given Statement of Scale is 1 inch representing 1 mile and read the distances in miles and furlongs.

NOTE:

By convention, a length of nearly 6 inches is taken to draw a graphical scale.

Calculations

To get the length of line for the graphical scale, these steps may be followed:

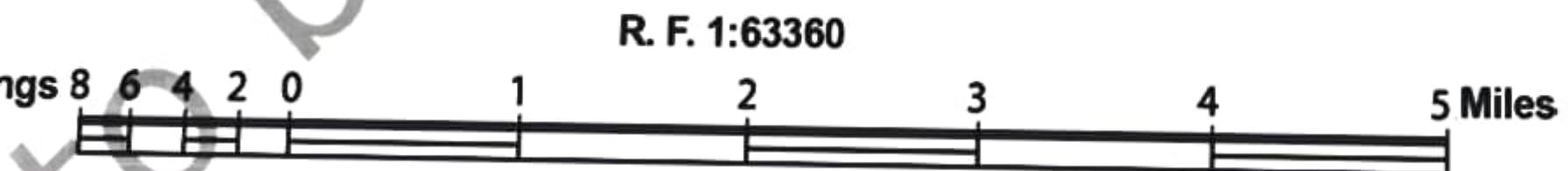
1 inch represents 1 mile

or 6 inches represents 6 miles

Construction

The graphical scale may be constructed in the following steps:

Draw a straight line of 6 inches and divide it into 6 equal parts and assign a value of 1 mile each for 5 right side divisions. Also divide the extreme left side division into 4 equal parts and mark each division by a value of 2 miles each, beginning from 0.





Problem 3

Construct a graphical scale when the given R. F. is 1 : 50,000 and read the distances in miles and furlongs.

Calculations

To get the length of the line for the graphical scale, these steps may be followed:

1 : 50,000 means that

1 unit represents 50,000 units

or 1 inch represents 50,000 inches.

or 6" represents $50,000 \times 6/63,360$ miles

= 6' represents 4.73 miles

Since a figure of 4.73 (miles) is not a round number, we take 5 as the round number.

To determine the length of the line to show 5 km, the following calculations are to be carried out :

$$\begin{aligned} & 4.73 \text{ miles are represented by a line of 6 inches} \\ & 5 \text{ miles will be represented by a line of } 6 \times 5/4.73 \\ = & 5 \text{ miles will be represented by a line of 6.34 inches} \end{aligned}$$

Construction The graphical scale may be constructed in the following steps:

To construct a graphical scale to show 5 miles we need to draw a line of 6.34 inches and divide it into 5 equal parts. The question is how can an unequal line of 6.3 inches be divided into 5 equal parts. To do so we can use the following procedure:

- ◇ Draw a straight line of 6.3 inches.
- ◇ Draw lines at an angle of 40° or 45° from the start and end nodes of the lines and divide them into 5 equal parts of 1 or 1.5 inches each.
- ◇ Draw dotted lines joining the divisions marked on the two lines.
- ◇ Mark the intersections of these lines at the primary scale.

By doing so, you will divide the unequal line of 6.3 inches into 5 equal parts. You can repeat the same way to divide the extreme left part on the primary scale into 4 or 8 parts to show the number of furlongs that are equivalent to 1 mile.

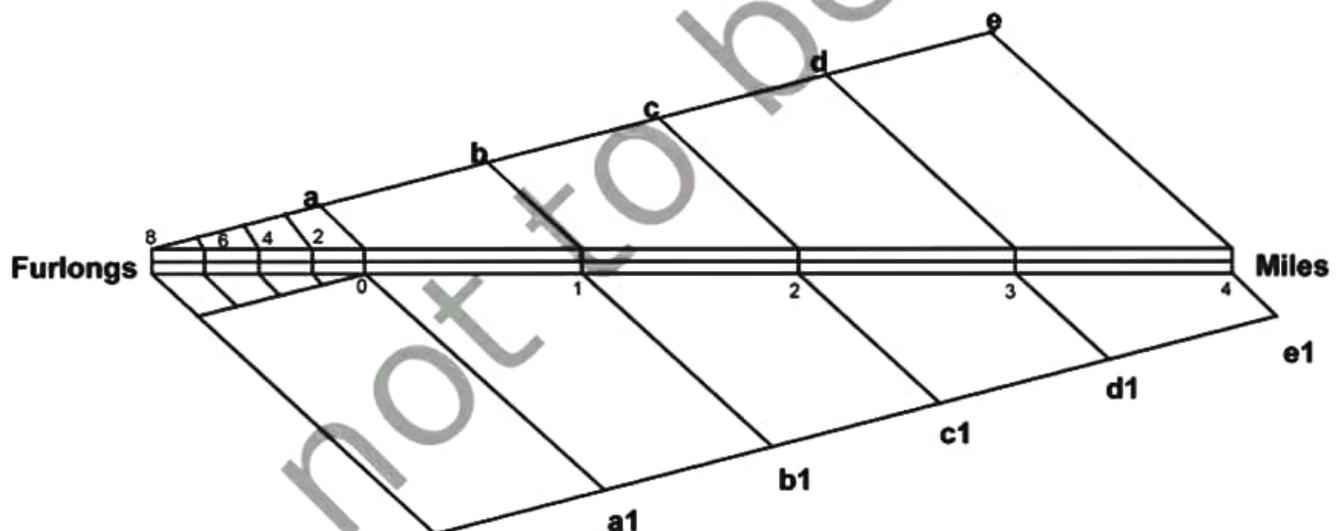


Figure 2.4 Drawing of equal divisions in a graphical scale

Problem 3

Construct a graphical scale when the given R. F. is 1 : 50,000 and read the distances in miles and furlongs.

Calculations

To get the length of the line for the graphical scale, these steps may be followed:

1 : 50,000 means that

1 unit represents 50,000 units

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Since a figure of 4.73 (miles) is not a round number, we take 5 as the round number.

To determine the length of the line to show 5 km, the following calculations are to be carried out :

4.73 miles are represented by a line of 6 inches

5 miles will be represented by a line of $6 \times 5/4.73$

= 5 miles will be represented by a line of 6.34 inches

Construction The graphical scale may be constructed in the following steps:

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