Can you tell?

Figure 9.1: A Painter Taking an estimate of a scene

Figure 9.2: Students looking at a map

After studying the picture have a discussion in the class and answer the following questions.

➢ Why is the painter holding the pencil in his hand in a particular way?

➢ How can the scene of this large landscape be depicted on paper?

➢ How is it possible to view all the countries of the world on one map?

➢ What is common to both these pictures?

Geographical explanation

The painter first takes an estimated scale of the scene in front of him with a pencil. After that he draws a sketch on the paper. The painter does this so that the picture is drawn to scale.

In the preparation of maps, the picture is first surveyed. At that time after special observation a scale is fixed. Using this scale, an outline map of the whole earth or a part of it is prepared.

Try this.

✓ In order to measure the height of students, make markings on the wall from the ground up to a height of 180 cm. with the help a ruler.

✓ Measure the height of each student and note it down.

✓ With the same wall as a backdrop take a photograph of the students in groups of five. Fig 9.3

Figure 9.3 : Measurement of students' heights

- ✓ Take prints of the photograph.
- ✓ With the help of ruler measure the heights of your friends from the photographs.
- ✓ Complete the following table with the actual heights and the heights as per the photograph. Calculate the ratio. The ratio of Gopal's height has been calculated and shown below.

Sr. No.	Name of the Student	Height as per photograph (cms)	Actual Height (cms)	Ratio
e.g	Gopal	10	130	1:13
1.				
2.				
3.				
4.				
5.				

From the above table you must have realized the difference between the actual heights and the height in the photograph. You must have also realized that in the photograph everyone's height has decreased in the same proportion. The same principle is applicable in the case of a map scale.

Geographical explanation

We obtain information about the earth or some specific part of it from a globe or a map. While preparing a map, in order to get the actual ground distances on to paper, some conversions have to be made using Geometry and Mathematics. The use of map scale is useful for this conversion. Lets us get acquainted with this aspect of maps.

Can you tell?

The actual distance between the two villages of Sahil and Minal is 50 km. The distance between the villages of Minal and Pragnya is 20 km and between Sahil and Pragnya's villages is 60 km. Fig. 9.4 shows the location of these villages on a map. The scale of the map is 1 cm = 10 km. Measure the distances on the map and find out which village belongs to whom? Note the names and the distances.

Geographical explanation

In a map scale it is essential to correlate the distance between two points on a map and the actual distance between these two points on the ground. The ratio of the map distance to the ground distance is map scale.

To draw a map true to scale it is essential to know the ground distances. These distance are measured during surveying. While preparing a map, based on the distances a suitable ratio is selected. After the preparation of the map it is necessary to mention the map scale. This facilities map reading and helps in understanding the distances on the ground.

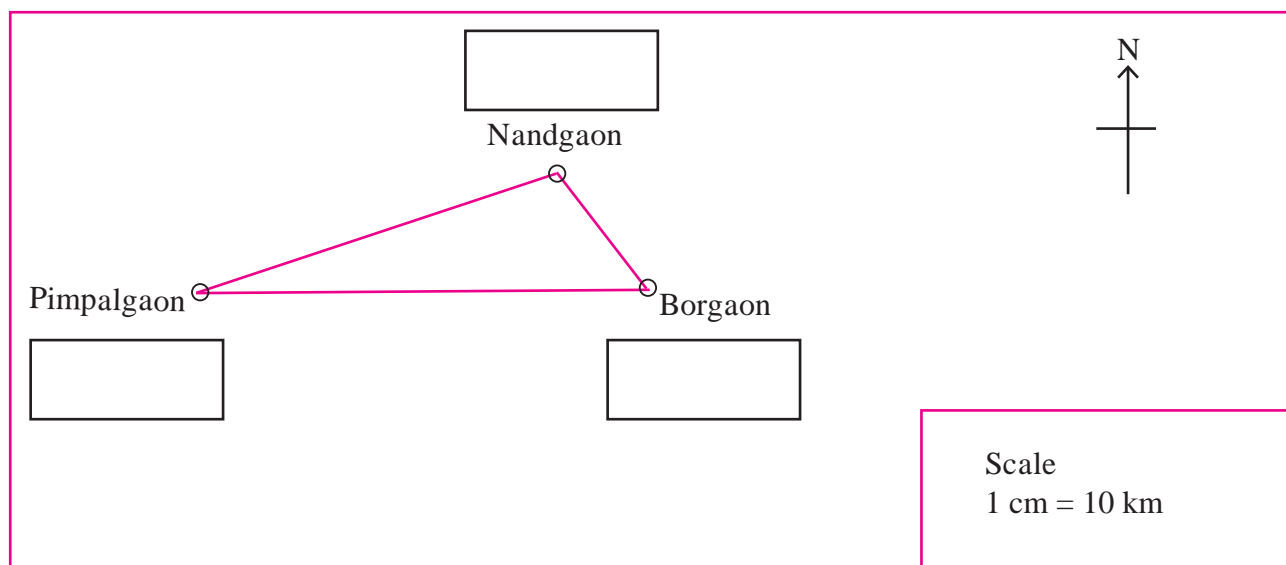There are three ways of expressing the scale on a map.

Nandgaon

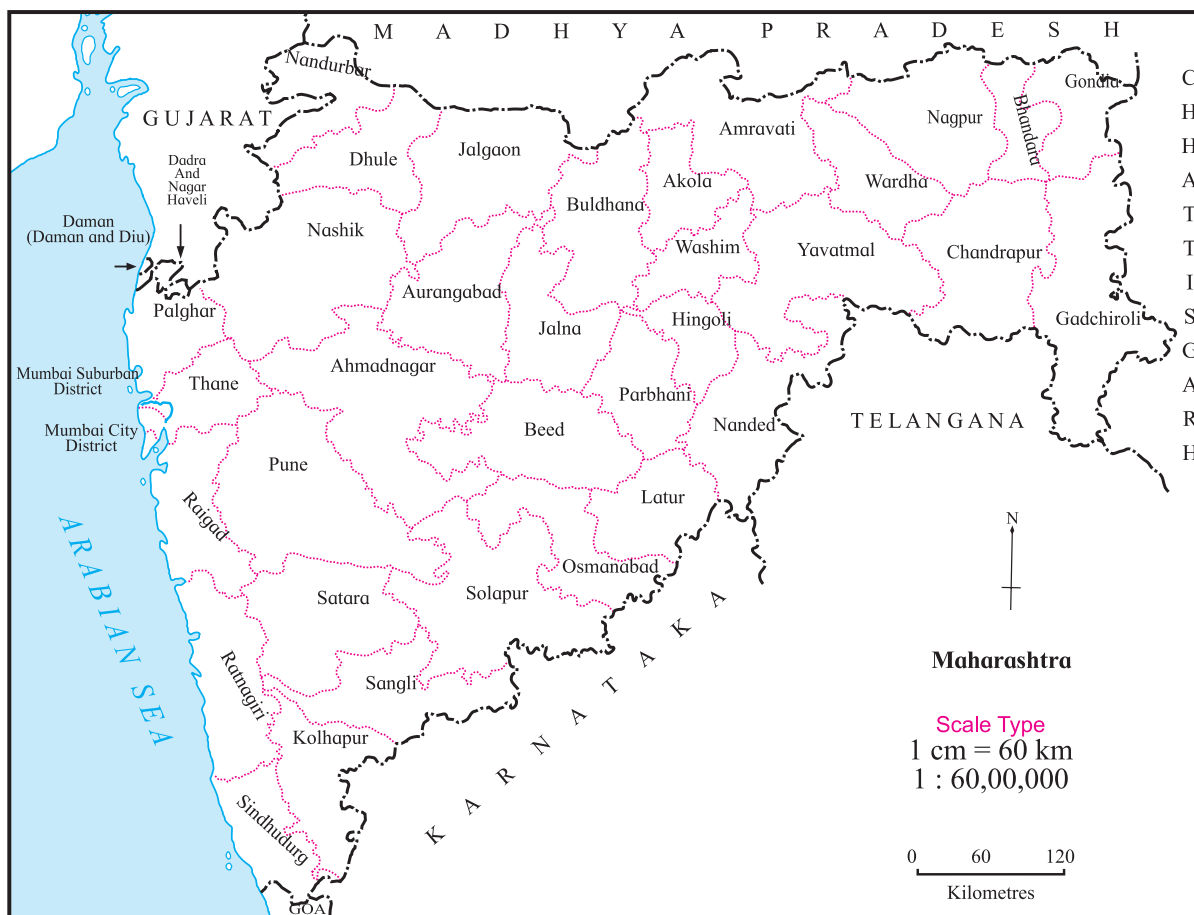Pimpalgaon Borgaon

N

Scale
1 cm = 10 km

Figure 9.4

Figure 9.5

(1)   Verbal Scale
(2)   Numerical Scale
(3)   Linear Scale/Graphical Scale.

In fig. 9.5 a map is given. All the above methods of map scale are shown on the map. Carefully note the different ways of writing the scale.

(1) Verbal Scale : A verbal scale is one in which distances are expressed with the use of words indicating measurement e.g. if the scale is 1 cm = 60 km then cm is the unit of distance on the map and km, the unit of distance on the ground.

(2) Numerical Scale : The scale is expressed as a ratio. E.g. in 1:60, 00, 000 1 represents the distance on the map, and 60, 00, 000 represents the distance on the ground. This is 60,00,000 times the map distance. It is

also known as representative fraction. In this scale only numbers are used. This scale is also written as 1:60, 00, 000. In this method there are no words used indicating measurement. The same unit used for the figures on the left hand side is also used for the figures on the right hand side.

(3) Linear Scale : This scale is shown graphically on a map. The distance between any two points on a map is measured with the help of linaer/graphical scale e.g.

If a ruler is not available then a compass, a blade of grass or for curves a thread can be used for measuring the actual distances between places on a map. You will understand this with the help of the next exercise.

The importance of Graphical scale :

Very often it is necessary to reduce or enlarge the original map. During that process the scale of the map changes. There are many methods of reducing or enlarging maps. One of them is by taking a photo copy of the original map and reducing or enlarging it. When the map is reduced or enlarged by this method the verbal and the numerical scale on the original map does not change. But if a graphical scale is drawn on the original map, then the scale changes as per the changing size of the map. Although the font size of the verbal and numerical scale changes the values do not change.Hence graphical scales are drawn in atlas and wall maps.

Try this.

In figure 9.6, some locations within the premises of a university are given. The distance between the statue and the entrance gate is 0.5 km. Measure this distance and determine the scale.
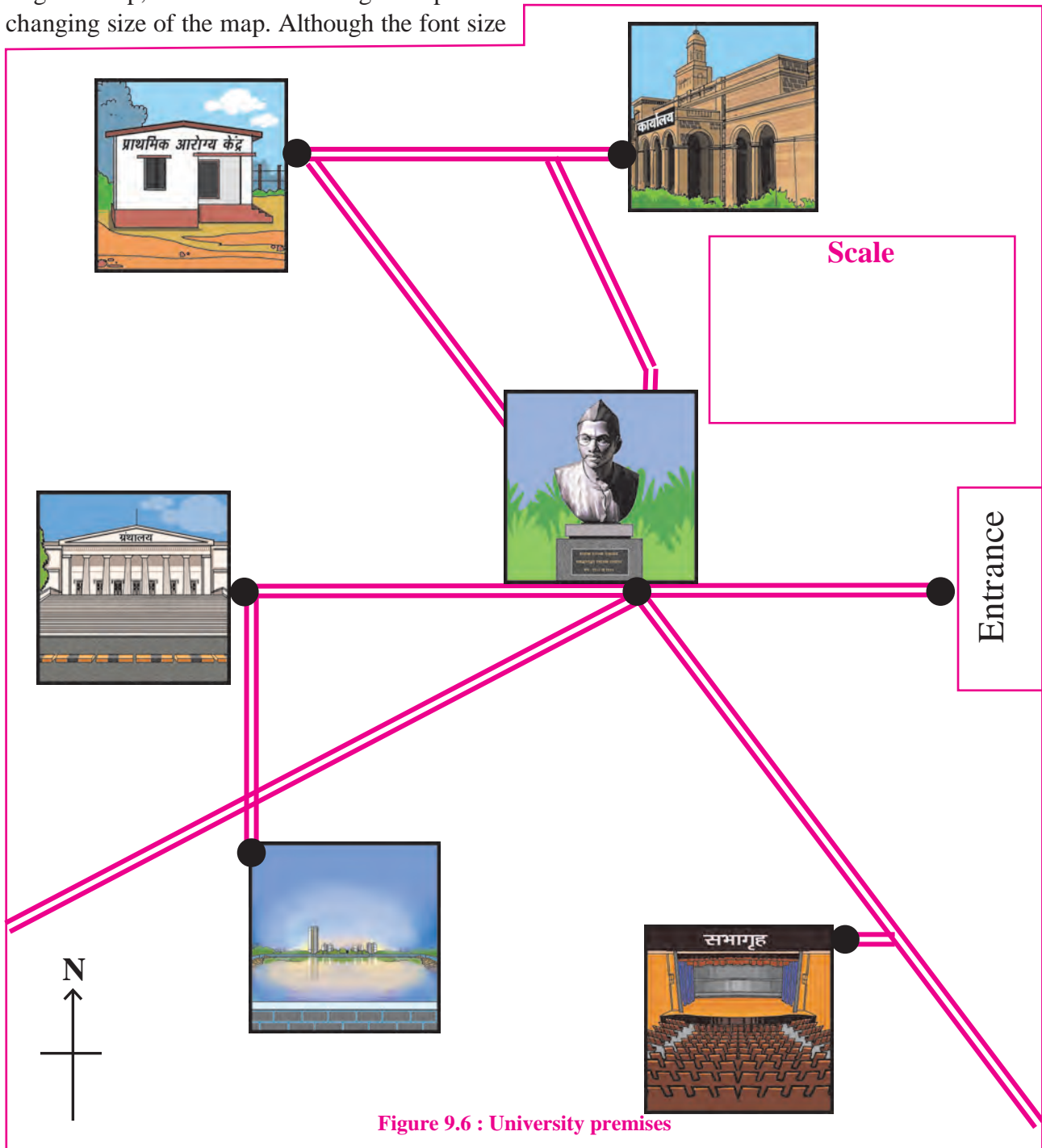
Scale

Entrance

N

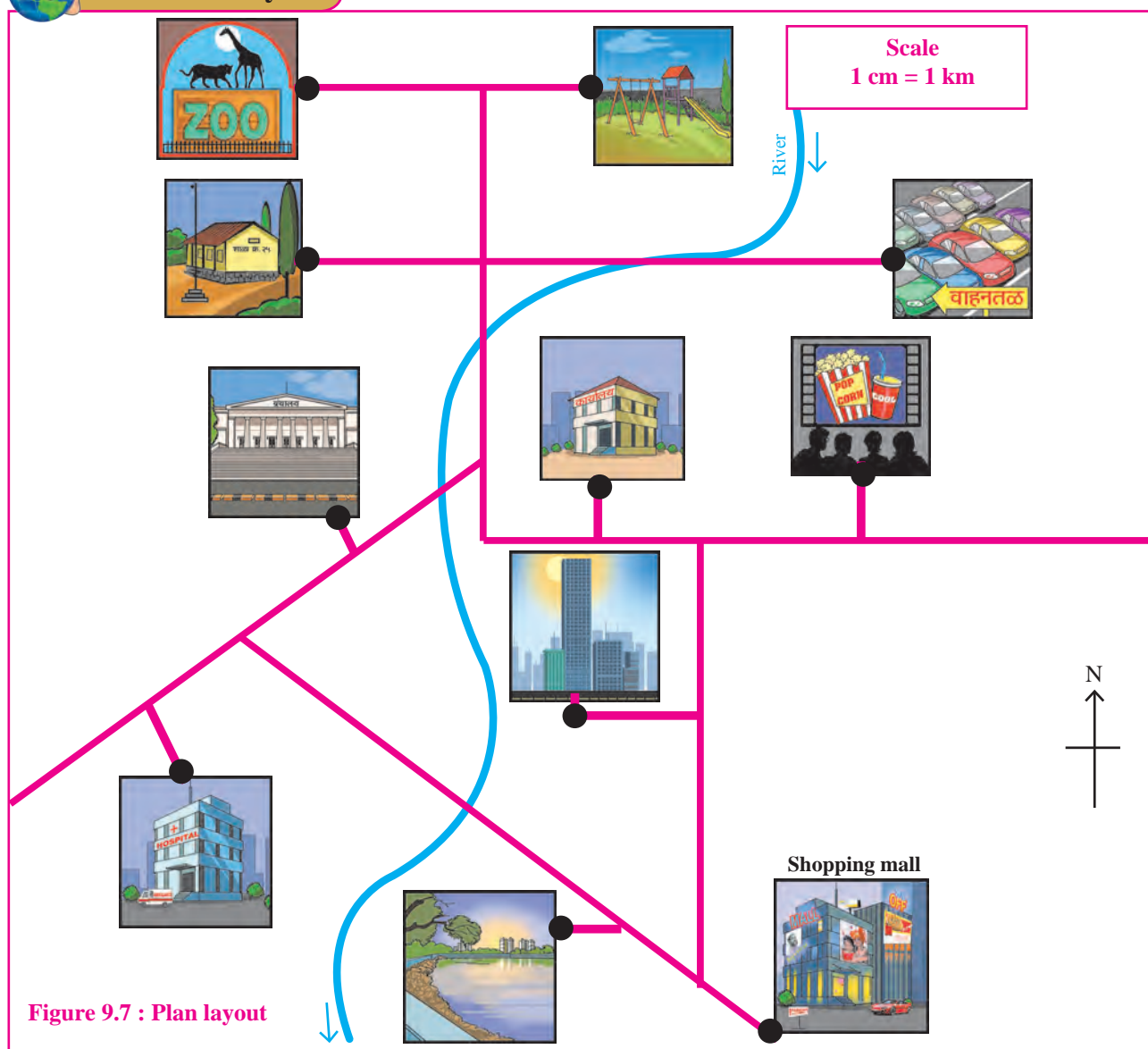**Figure 9.6 : University premises**

Write the verbal scale, numerical scale and graphical scale in the vacant box in the sketch.

On the basis of the road shown between the two locations, calculate the actual distances between two locations on the basis of figure 9.6

(1) Health Centre to Library   _____

(2) Lake to Auditorium   _____

(3) Office to Lake   _____

(4) Auditorium to office   _____

(5) Health centre to Auditorium   _____

(6) Lake to Library   _____

On the basis of figure 9.7 , calculate the distance of various locations from the shopping mall and write in the table given below.

Large scale and small scale maps :

When a small area on the ground is shown covering a large area on the map, it is a large scale map. Maps of a city, village, agricultural fields etc. are all examples of large scale maps. Generally maps with a scale of less than 1:10, 000 are known as large scale maps.

Give it a try.

**Scale
1 cm = 1 km**

River

N

Shopping mall

Figure 9.7 : Plan layout

Distance from Shopping Mall (in km)	Vehicle Parking	School	Theatre	Office	Library	Hospital	Park	Lake	Zoo	Residential Buildings

(2) Length of the river in figure 9.7 _____

In mathematics when we compare two fractions then the fraction with the smaller number in the denomination has a higher value. Map scales are not in fractions but they are ratios. The same principle of fractions is used while comparing ratios. Hence a numerical scale of 1:10, 000 is called a large scale and a numerical scale of 1:50, 000 a small scale.

When a part of the ground covers a small area on the map, they are small scale maps. That means when a small scale is used to show the information about a large part of the earth, these are small scale maps.

Maps in an atlas and world maps are examples of small scale maps. Most of the maps in an atlas are example of small scale maps.

Always remember -

Distance on the Map	Verbal Scale 1 cm = 60 km	Distance on ground
Distance on the Map	Numerical scale 1 : 60,00,000	Distance on ground
Distance on the Map	Graphical Scale Km 60 30 0 60 120 180 km	Distance on ground

Think about it.

What is the need to use map scale? Think about it and write a paragraph.

Always remember -

On the map, the left side of the scale shows the distance on the map and the right side shows the actual distance on the ground.

Always remember -

Type of Map	Area	Information	Examples
Large scale	Small	Shows more details	Maps of villages, schools, agricultural fields
Small scale	Large	Less details	Atlas map, Country, Continent, World etc.

Give it a try.

Classify the following numerical scales into large scale and small scale. The symbol of a village as per the numerical scale of 1:1, 00, 000 is shown. Think, how the size would change as per the different scales and try to sketch them in a notebook.

1: 1, 00, 000 = ▪

1:25,000

1: 2, 500

1: 10, 00, 000

1: 2, 50, 000

1: 5, 000

1: 1, 000

1: 50, 000

Figure 9.8 : Large scale map

Scale

N

Verbal   numerical

km   km
50 25 0   50   100   150   200
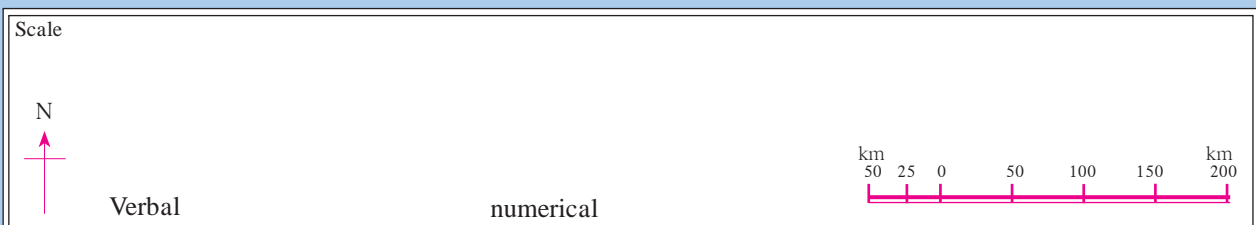
Q. (1) (a) Classify maps showing the following areas into small scale or large scale

(1) Building   (2) School

(3) Country of India   (4) Church

(5) Mall   (6) World Map

(7) Garden   (8) Dispensary

(9) Maharashtra State (10) The north sky at night

(b) There are two maps with respective scales of 1cm=100m and 1cm=100km. Give a well reasoned answer as to which of them would be a large scale map and which a small scale map. Recognize the type of maps.

Q. (2) Using a map of India from the atlas measure straight line distance between the following cities and complete the table below.

Cities	Distance on map	Actual Distance
Mumbai to Bengaluru	....	----km
Vijaypura to Jaipur	....	----km
Hyderabad to Surat	....	----km
Ujjain to Shimla	....	----km
Patna to Raipur	....	----km
Delhi to Kolkata	....	----km

Q. (3) (a) The distance between two points A and B on the Ground is 500m. Show this distance on paper by a line of 2cm. Express the map scale by any one method and mention it.

(b) Convert verbal scale of 1cm=53km to a numerical scale

(c) Convert the numerical scale of 1:10,000 000 to a verbal scale in the metric system.

Q (4) Help them, using road and railway maps of the state of Maharashtra. Use the scale given in the maps.

(a) Ajay wants to arrange a family trip. Beed-Aurangabad-Dhule-Nasik-Mumbai-Pune-Solapur-Beed. He wants to visit tourist places along this route. The cost of the vehicle is Rs 12/- per km. What would be the approximate cost of travel?

(b) Saloni has been asked to organize a trip by her teacher. She has selected Nagpur-Chandrapur-Nanded-Washim-Akola-Malkapur. What would be the total coverage in kilometers?

(c) Vishawasrao is transporting goods in a vehicle from Alibag (district Raigad) to Naldurg (district – Osmanabad). How many km. will he be covering aproximately for a to and fro travel?

Projects :

● Measure the length and breadth of your school. Prepare a sketch according to scale. Show different parts of your school on the sketch.

● With the help of google maps find the distance between your village and your neighbouring village. Represent all the three methods of map scale on paper.

❋❋❋

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