# CBSE NCERT Solutions for Class 7 Mathematics Chapter 3

***Back of Chapter Questions***

## Exercise 3.1

**1.** Find the range of heights of any ten students of your class.

**Solution:**

Let us assume the heights of ten students of the class in cm to be:

$130, 132, 135, 139, 143, 145, 148, 150, 152, 157$

Height of the tallest student $= 157$ cm

Height of the shortest student $= 130$ cm

Range = Highest value − lowest value

$= 157 - 130$

$= 27$ cm

**2.** Organize the following marks in a class assessment, in a tabular form.

$4, 6, 7, 5, 3, 5, 4, 5, 2, 6, 2, 5, 1, 9, 6, 5, 8, 4, 6, 7$

(i) Which number is the highest?

(ii) Which number is the lowest?

(iii) What is the range of the data?

(iv) Find the arithmetic mean.

**Solution:**

Let us organize the marks in a tabular form

| Marks | Tally Marks | Frequency |
|---|---|---|
| 1 | II | 2 |
| 2 | II | 2 |
| 3 | I | 1 |
| 4 | III | 3 |
| 5 | ~~IIII~~ | 5 |
| 6 | IIII | 4 |
| 7 | II | 2 |
| 8 | I | 1 |

| | | |
|---|---|---|
| 9 | I | 1 |

(i) The highest number is 9

(ii) The lowest number is 1

(iii) Range = highest observation − lowest observation

$= 9 - 1$

$= 8$

(iv) Arithmetic mean $= \frac{\text{Sum of all the observations}}{\text{number of observations}}$

$= \frac{4+6+7+5+3+5+4+5+2+6+2+5+1+9+6+5+8+4+6+7}{20}$

$= \frac{100}{20}$

$= 5$

**3.** Find the mean of the first five whole numbers.

**Solution:**

The first five whole numbers are $0, 1, 2, 3$ and $4$

Mean $= \frac{\text{Sum of the numbers}}{\text{total number of numbers}}$

$= \frac{0+1+2+3+4}{5}$

$= \frac{10}{5}$

$= 2$

**4.** A cricketer scores the following runs in eight innings:

$58, 76, 40, 35, 46, 45, 0, 100$. Find the mean score.

**Solution:**

Mean score $= \frac{\text{Sum of the numbers}}{\text{total number of numbers}}$

$= \frac{58+76+40+35+46+45+0+100}{8}$

$= \frac{400}{8}$

$= 50$

**5.** Following table shows the points of each player scored in four games:

| Player | Game 1 | Game 2 | Game 3 | Game 4 |
|---|---|---|---|---|
| A | 14 | 16 | 10 | 10 |
| B | 0 | 8 | 6 | 4 |
| C | 8 | 11 | Did not play | 13 |

Now answer the following questions:

(i) Find the mean to determine A's average number of points scored per game.

(ii) To find the mean number of points per game for C, would you divide the total points by 3 or by 4? Why?

(iii) B played in all the four games. How would you find the mean?

(iv) Who is the best performer?

**Solution:**

(i) Mean of player A's points $= \frac{\text{Sum of scores by A}}{\text{no of games played by A}}$

$= \frac{14+16+10+10}{4}$

$= \frac{50}{4}$

$= 12.5$

(ii) To find the mean number of points per game for C, we should divide the total points by 3, because C played only 3 games

(iii) Mean of player B's points $= \frac{\text{Sum of scores by B}}{\text{no of games played by B}}$

$= \frac{0+8+6+4}{4}$

$= \frac{18}{4}$

$= 4.5$

(iv) Mean of player A=12.5

Mean of player B=4.5

Mean of player C=$\frac{8+11+13}{3}$

$=\frac{32}{3}$

$=10.67$

Therefore, on comparing the mean points of the three players, we can see that player A is the best performer

**6.** The marks (out of 100) obtained by a group of students in a science test are $85, 76, 90, 85, 39, 48, 56, 95, 81$ and $75$. Find the:

(i) Highest and the lowest marks obtained by the students.

(ii) Range of the marks obtained.

(ii) Mean marks obtained by the group.

**Solution:**

(i) The highest marks obtained by the student=95

The lowest marks obtained by the student=39

(ii) Range of the marks obtained=highest marks - lowest marks

$= 95 - 39$

$= 56$

(iii) Mean marks $= \frac{\text{Sum of marks}}{\text{total no of students}}$

$= \frac{85 + 76 + 90 + 85 + 39 + 48 + 56 + 95 + 81 + 75}{10}$

$= \frac{730}{10}$

$= 73$

Thus, the mean marks obtained by the students is 73

**7.** The enrolment in a school during six consecutive years was as follows: $1555, 1670, 1750, 2013, 2540, 2820$. Find the mean enrolment of the school for this period.

**Solution:**

Mean enrolment$=\frac{\text{Sum of enrolments}}{\text{total no of years}}$

$= \frac{1555 + 1670 + 1750 + 2013 + 2540 + 2820}{6}$

$= \frac{12348}{6}$

$= 2058$

Thus, the mean enrolment of the school is 2058

**8.** The rainfall (in mm) in a city on 7 days of a certain week was recorded as follows:

| Day | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| Rainfall (in mm) | 0.0 | 12.2 | 2.1 | 0.0 | 20.5 | 5.5 | 1.0 |

(i) Find the range of the rainfall in the above data.

(ii) Find the mean rainfall for the week.

(iii) On how many days was the rainfall less than the mean rainfall.

**Solution:**

(i) The range of the rainfall=highest rainfall - lowest rainfall

$= 20.5 - 0.0$

$= 20.5$ mm

(ii) Mean rainfall $= \frac{\text{Sum of rainfall recorded}}{\text{total no of days}}$

$= \frac{0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.5 + 1.0}{7}$

$= \frac{41.3}{7}$

$= 5.9$ mm

Thus, the mean rainfall for the week is 5.9 mm

(iii) Mean rainfall $= 5.9$ mm

The days when the rainfall was less than the mean rainfall are Monday, Wednesday, Thursday, Saturday and Sunday

Thus, the rainfall was less than the mean rainfall on 5 days

**9.** The heights of 10 girls were measured in cm and the results are as follows:

135, 150, 139, 128, 151, 132, 146, 149, 143, 141.

(i) What is the height of the tallest girl?

(ii) What is the height of the shortest girl?

(iii) What is the range of the data?

(iv) What is the mean height of the girls?

(v) How many girls have heights more than the mean height?

**Solution:**

(i) The height of the tallest girl is 151 cm

(ii) The height of the shortest girl is 128 cm

(iii) Range=height of the tallest girl - height of the shortest girl

$= 151 - 28$

$= 23$ cm

(iv) Mean height $= \frac{\text{Sum of the heights of the girls}}{\text{total no of girls}}$

$= \frac{135 + 150 + 139 + 128 + 151 + 132 + 146 + 149 + 143 + 141}{10}$

$= \frac{1414}{10}$

$= 141.4$ cm

Thus, the mean height of the girls is 141.4 cm

(v) The number of girls with height more than the mean height is 5

## Exercise 3.2

**1.** The scores in mathematics test (out of 25) of 15 students is as follows:

19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20

Find the mode and median of this data. Are they same?

**Solution:**

Let us arrange the scores in the ascending order:

5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25

Mode is the observation that occurs the highest number of times

$\therefore$ Mode $= 20$

Median is the middle observation

$\therefore$ Median $= 20$

Therefore, yes mode and median are the same for the given observations

**2.** The runs scored in a cricket match by 11 players is as follows:

$6, 15, 120, 50, 100, 80, 10, 15, 8, 10, 15$

Find the mean, mode and median of this data. Are the three same?

**Solution:**

Let us arrange the scores in the ascending order:

6, 8, 10, 10, 15, 15, 15, 50, 80, 100, 120

$\text{Mean}=\frac{\text{Sum of the runs scored by the players}}{\text{total no of players}}$

$=\frac{6+8+10+10+15+15+15+50+80+100+120}{11}$

$=\frac{429}{11}$

$=39$

Mode is the observation that occurs the highest number of times

$\therefore$ Mode $=15$

Median is the middle observation

$\therefore$ Median $=15$

Therefore, the mean, mode and median of the above observations are not the same

**3.** The weights (in kg.) of 15 students of a class are:

$38, 42, 35, 37, 45, 50, 32, 43, 43, 40, 36, 38, 43, 38, 47$

(i) Find the mode and median of this data.

(ii) Is there more than one mode?

**Solution:**

(i) Let us arrange the weights of the students in ascending order

$32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50$

Mode is the observation that occurs the highest number of times

$\therefore$ Mode $=38$ and $43$

Median is the middle observation

$\therefore$ Median $=40$

(ii) Yes, there are two modes

**4.** Find the mode and median of the data: $13, 16, 12, 14, 19, 12, 14, 13, 14$

**Solution:**

Let us arrange the given data in ascending order:

$12, 12, 13, 13, 14, 14, 14, 16, 19$

Mode is the observation that occurs the highest number of times

$\therefore$ Mode $= 14$

Median is the middle observation

$\therefore$ Median $= 14$

**5.** Tell whether the statement is true or false:

(i) The mode is always one of the numbers in a data.

(ii) The mean is one of the numbers in a data.

(iii) The median is always one of the numbers in a data.

(iv) The data $6, 4, 3, 8, 9, 12, 13, 9$ has mean 9.

**Solution:**

(i) True

(ii) False

(iii) True

(iv) False

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{total no of observations}}$$

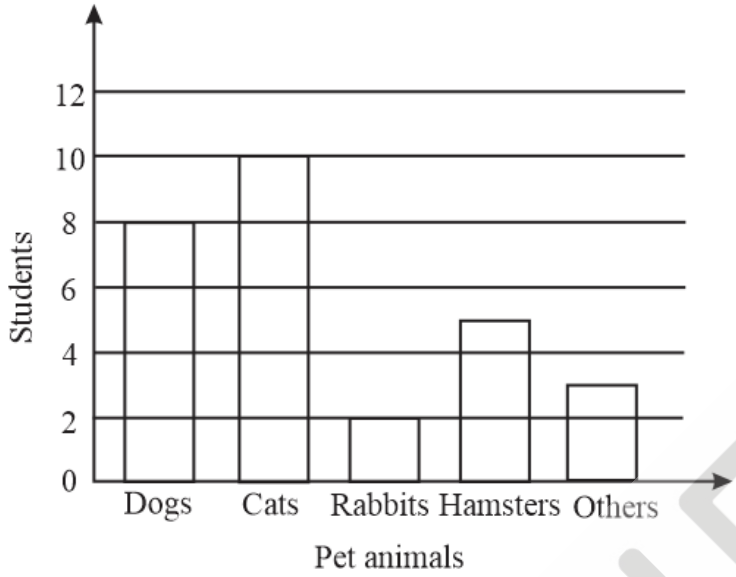
$$= \frac{6+4+3+8+9+12+13+9}{8}$$

$$= \frac{64}{8}$$

$$= 8$$

## Exercise 3.3

**1.** Use the bar graph (Fig) to answer the following questions.




(a) Which is the most popular pet?

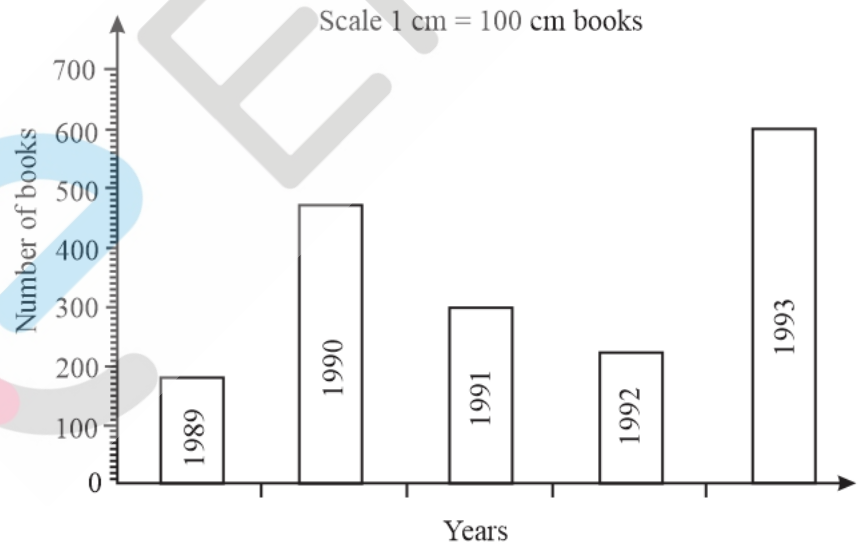
(b) How many students have dog as a pet?

**Solution:**

(a) The most popular pet is cats

(b) 8 students have dog as a pet

**2.** Read the bar graph (Fig) which shows the number of books sold by a bookstore during five consecutive years and answer the following questions:




(i) About how many books were sold in 1989? 1990? 1992?

(ii) In which year were about 475 books sold? About 225 books sold?

(iii) In which years were fewer than 250 books sold?

(iv) Can you explain how you would estimate the number of books sold in 1989?

**Solution:**

(i) According to the data given in the bar graph

(a) Number of books sold in 1989 is 180

(b) Number of books sold in 1990 is 475

(c) Number of books sold in 1992 is 225

(ii) 475 books were sold in the year 1990 and 225 books were sold in the year 1992

(iii) In the years 1989 and 1990 fewer than 250 books were sold

(iv) The number of books sold in 1989 could be estimated by reading the graph plotted based on the scale that has been taken.

**3.** Numbers of children in six different classes are given below. Represent the data on a bar graph.

| Class | Fifth | Sixth | Seventh | Eighth | Ninth | Tenth |
|---|---|---|---|---|---|---|
| Number of Children | 135 | 120 | 95 | 100 | 90 | 80 |

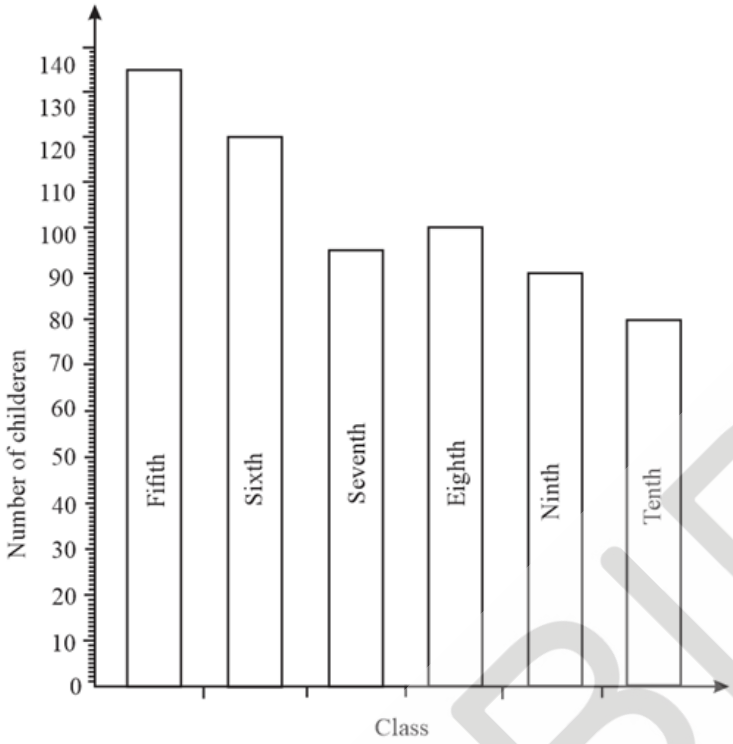
(a) How would you choose a scale?

(b) Answer the following questions:

(i) Which class has the maximum number of children? And the minimum?

(ii) Find the ratio of students of class six to the students of class eight.

**Solution:**




(a) The values i.e., the number of children range from $80-135$, so the scale can be taken as $1\text{cm} = 10$ units

(b) (i) Fifth class has the maximum number of children. And the tenth class has the minimum of children

(ii) Ratio of students of class six to the students of class eight is:

$$= \frac{\text{number of students of class six}}{\text{number of students of class eight}}$$

$$= \frac{120}{100}$$

$$= \frac{6}{5}$$

$$= 6:5$$

**4.** The performance of a student in 1st Term and 2nd Term is given. Draw a double bar graph choosing appropriate scale and answer the following:

| Subjects | English | Hindi | Math | Science | Social science |
|---|---|---|---|---|---|
| 1st term (max marks 100) | 67 | 72 | 88 | 81 | 73 |

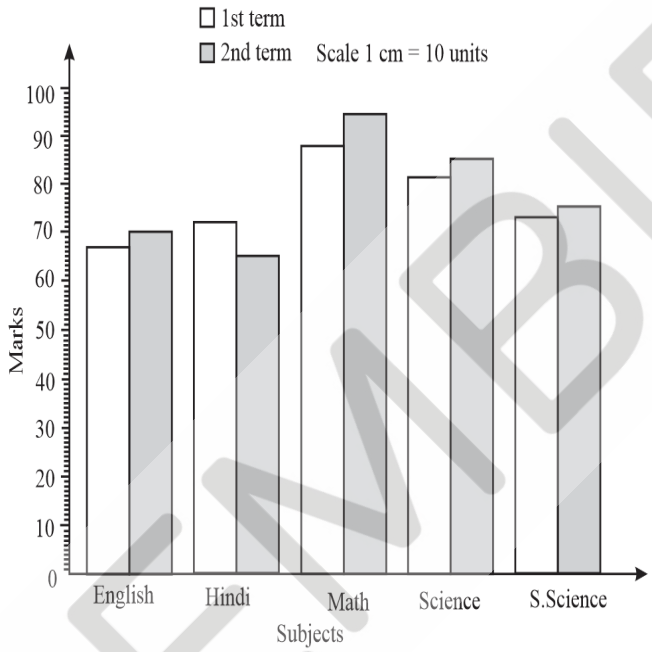
| | | | | | |
|---|---|---|---|---|---|
| 2nd term (max marks 100) | 70 | 65 | 95 | 85 | 75 |

(i) In which subject has the child improved his performance the most?

(ii) In which subject is the improvement the least?

(iii) Has the performance gone down in any subject?

**Solution:**




Difference of marks of the student between the 2nd and the 1st terms is:

English: $70-67=3$, Hindi: $65-72=-7$, Math: $95-88=7$

Science: $85-81=4$, Social science: $75-73=2$

(i) The subject in which the child has improved his/her performance the most is Math

(ii) The subject in which the child's improvement is the least is Social science

(iii) Yes, the performance has gone down in Hindi

**5.** Consider this data collected from a survey of a colony.

| Favourite Sports | Cricket | Basket Ball | Swimming | Hockey | Athletics |
|---|---|---|---|---|---|
| Watching | 1240 | 470 | 510 | 430 | 250 |

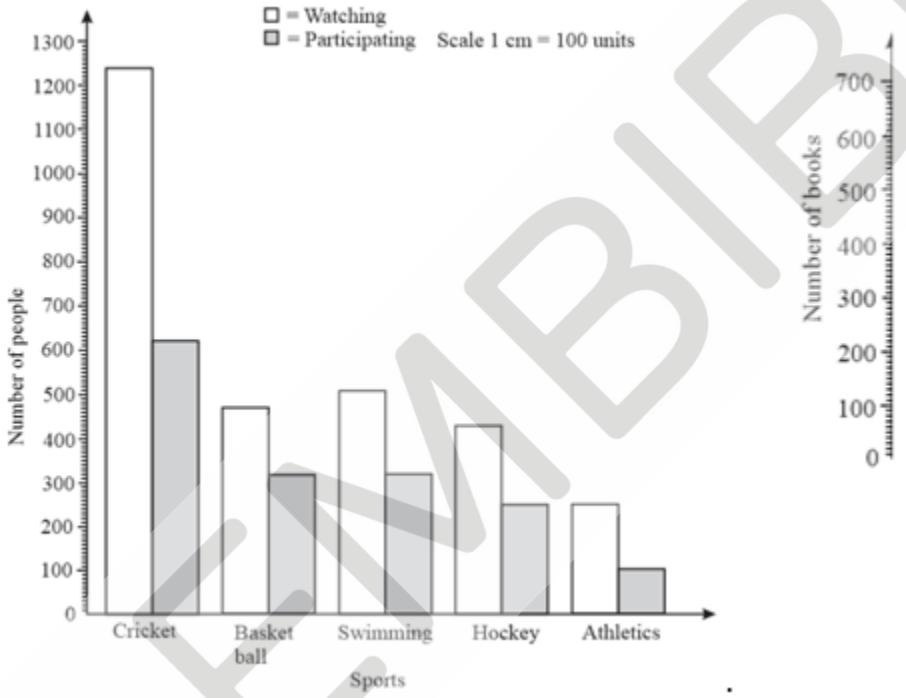
| | | | | | |
|---|---|---|---|---|---|
| Participating | 620 | 320 | 320 | 250 | 105 |

(i) Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?

(ii) Which sport is the most popular?

(iii) Which is more preferred, watching or participating in sports?

**Solution:**




(i) It can be inferred from the bar graph that the data given from a survey a represents the number of people in the colony who are watching their favourite sports and the number of people in the colony who are participating in their favourite sports

(ii) Cricket is the most popular sport among the people in the colony.

(iii) Watching their favourite sports is most preferred in the colony

**6.** From the data given below showing the minimum and the maximum temperature of various cities, plot a double bar graph and answer the following:

| **Cities** | **Ahmedabad** | **Amritsar** | **Bangalore** | **Chennai** | **Delhi** | **Jaipur** | **Jammu** | **Mumbai** |
|---|---|---|---|---|---|---|---|---|
| Max Temp(°C) | 38 | 37 | 28 | 36 | 38 | 39 | 41 | 32 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Min Temp(°C) | 29 | 26 | 21 | 27 | 28 | 29 | 26 | 27 |

(i) Which city has the largest difference in the minimum and maximum temperature

on the given date?

(ii) Which is the hottest city and which is the coldest city?

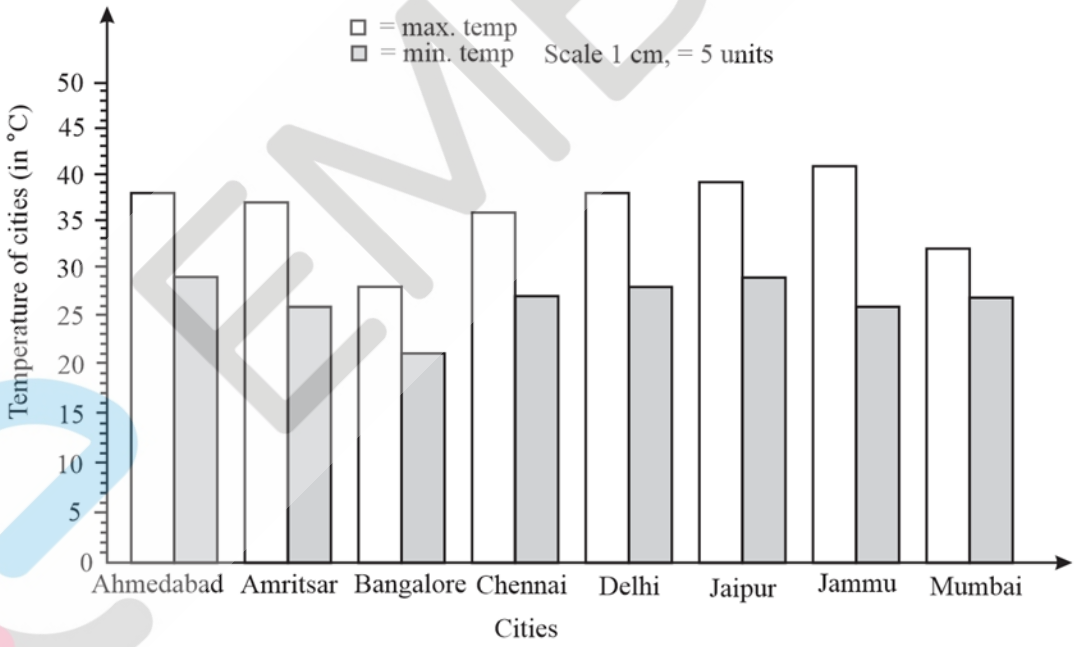
(iii) Name two cities where maximum temperature of one was less than the minimum

temperature of the other.

(iv) Name the city which has the least difference between its minimum and the

maximum temperature.

**Solution:**




Difference in the minimum and maximum temperature of the cities

Ahmedabad: $29°C - 38°C = -9°C$

Amritsar: $26°C - 37°C = -11°C$

Bangalore: $21°C - 28°C = -7°C$

Chennai: $27°C - 36°C = -11°C$

Delhi: $28°C - 38°C = -10°C$

Jaipur: $29°C - 39°C = -10°C$

Jammu: $26°C - 41°C = -15°C$

Mumbai: $27°C - 32°C = -5°C$

(i) Jammu has the largest difference $(26°C - 41°C = -15°C)$ in the minimum and maximum temperature on the given date?

(ii) Jammu is the hottest city and Bangalore is the coldest city

(iii) Ahmedabad and Jaipur are two cities with a minimum temperature of 29°C. Maximum temperature of Bangalore is 28°C which is even less than the minimum temperature of Ahmedabad and Jaipur.

(iv) Mumbai has the least difference $(27°C - 32°C = -5°C)$ between its minimum and the maximum temperature

## Exercise 3.4

**1.** Tell whether the following is certain to happen, impossible, can happen but not certain.

(i) You are older today than yesterday.

(ii) A tossed coin will land heads up.

(iii) A die when tossed shall land up with 8 on top.

(iv) The next traffic light seen will be green.

(v) Tomorrow will be a cloudy day.

**Solution:**

(i) It is certain to happen

(ii) It can happen but not certain

(iii) It is impossible

(iv) It can happen but not certain

(v) It can happen but not certain

**2.** There are 6 marbles in a box with numbers from 1 to 6 marked on each of them.

(i) What is the probability of drawing a marble with number 2?

(ii) What is the probability of drawing a marble with number 5?

**Solution:**

(i) Total number of marbles in the box $= 6$

The probability of drawing a marble with number 2 is

$$P = \frac{1}{6}$$

(ii) Total number of marbles in the box $= 6$

The probability of drawing a marble with number 5 is

$$P = \frac{1}{6}$$

**3.** A coin is flipped to decide which team starts the game. What is the probability that your team will start?

**Solution:**

When a coin is flipped, there are 2 outcomes, either Head or Tail.

The probability of getting a head or a tail is equal

$\therefore$ The probability of our team starting, $P = \frac{1}{2}$