BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI -110034

WEEK: 12th to 16thOctober 2020

SUBJECT: MATHEMATICS

NUMBER OF BLOCKS: 3

CLASS: VII

TOPIC: CHAPTER 3: DATA HANDLING

GUIDELINES

Dear Students

Kindly refer to the following notes/video links for the Chapter- **"DATA HANDLING"** and thereafter do the questions in your Mathematics notebook.

NOTE- Students can download the NCERT textbook chapter "Data Handling" using the following link:-

https://ncert.nic.in/ncerts/l/gemh103.pdf

SUB TOPICS

1. Collection, organisation and representation of data.
2. Finding Arithmetic Mean, Range of the data.
3. Finding Mode and Median of the data.
4. Reading and drawing of Bar Graph.

TEACHING AIDS USED

Power point presentations, PDF documents, videos and digital white boards with the help of screen presentation.

Explaining on white board with marker (showing with the help of device's camera)

LEARNING OBJECTIVES

Each student will be able to:

- Organise data for drawing conclusions.
- Compute Mean, Mode and Median of the given data.
- Find Range of the given data.
- Interpret the data given in the form of Bar graph.
- Represent data in the form of Bar graph.

BLOCK – 1

INTRODUCTION

You must have come across such data in the recent times, be it IPL or Covid related news. The data can be represented in various forms like Bar graphs or pie chart, frequency polygons, Venn diagrams etc.

In this chapter, we will be dealing with computing mean, median and mode of the given data and representing as well as reading of given data in the form of Bar Graph.

MI vs SRH Dream 11 Bowler			
Player	Team	IPL 2020 Average Dream11 Points	Last Match Dream11 Points
Trent Boult	MI	45.0	33 Points
Rahul Chahar	MI	43.5	54 Points
J Pattinson	MI	39.0	54 Points
Jasprit Bumrah	MI	35.5	58 Points
Rashid Khan	SRH	35.75	10 Points
T Natarajan	SRH	34.5	50 Points
Bhuvneshwar Kumar	SRH	22.25	29 Points
Khaleel Ahmed	SRH	18.6	4 Points
Sandeep Sharma	SRH	12.0	12 Points
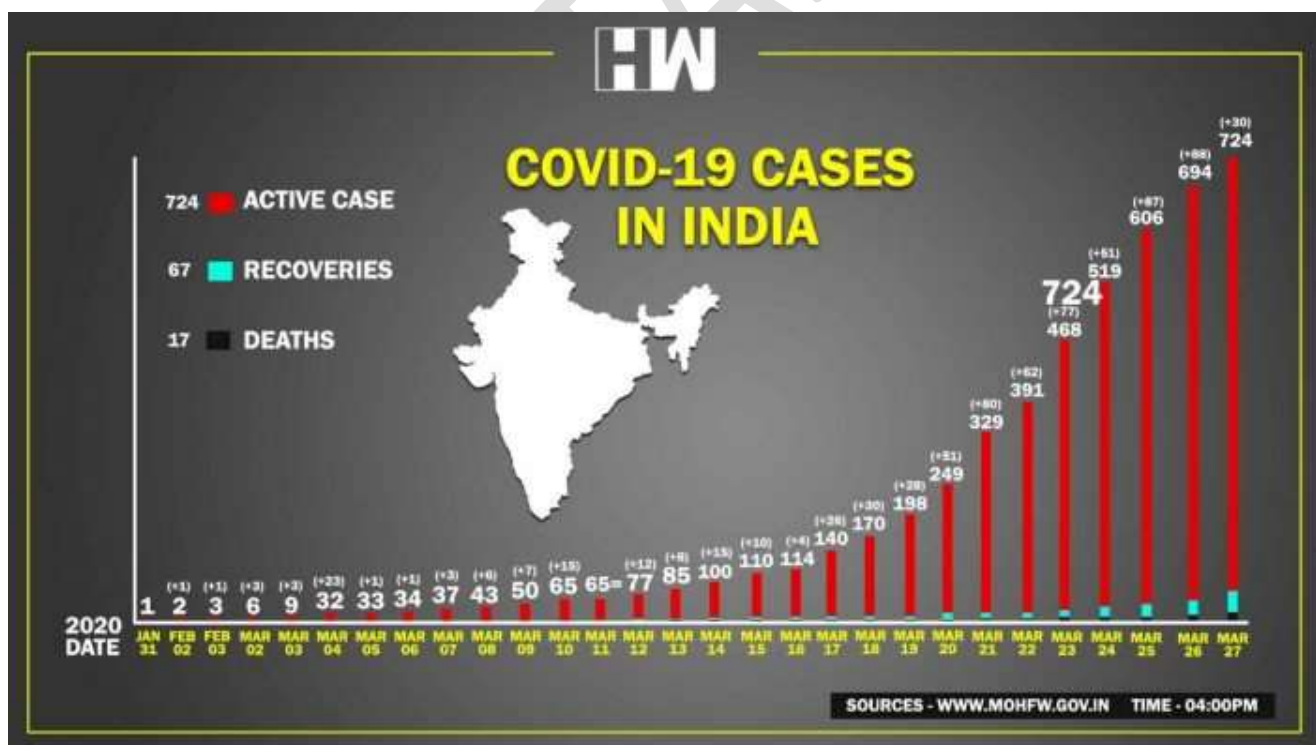
The collection, recording and presentation of **data** helps us organize our experiences and draw inferences from them. Before collecting **data** it **is** important to know what **we would** use it for.

Proper organization of **data is** very important since it ensures that **data is** easy to understand and interpret.

AIRITHMETIC MEAN:

The most common representative value of a group of data is the **arithmetic mean** or the **mean**. To understand this in a better way, let us look at the following example:

Two vessels contain 20 litres and 60 litres of milk respectively. What is the amount that each vessel would have, if both share the milk equally? When we ask this question we are seeking the arithmetic mean.

In the above case, the average or the arithmetic mean would be

$$\frac{\text{Total quantity of milk}}{\text{Number of vessels}} = \frac{20+60}{2} \text{ litres} = 40 \text{ litres.}$$

Thus, each vessels would have 40 litres of milk.

The average or Arithmetic Mean (A.M.) or simply mean is defined as follows:

$$\text{mean} = \frac{\text{Sum of all observations}}{\text{number of observations}}$$

Example

The marks of seven students in a mathematics test with a maximum possible mark of 20 are given below:

    15   13   18   16   14   17   12

Find the mean of this set of data values.

Solution:

$$\text{Mean} = \frac{\text{Sum of all data values}}{\text{Number of data values}}$$
$$= \frac{15+13+18+16+14+17+12}{7}$$
$$= \frac{105}{7}$$
$$= 15$$

So, the mean mark is 15.

RANGE

The difference between the highest and the lowest observation gives us an idea of the spread of the observations. This can be found by subtracting the lowest observation from the highest observation. We call the result the **range** of the observation. Look at the following example:

Example: Cheryl took 7 math tests in one marking period. What is the range of her test scores?

89, 73, 84, 91, 87, 77, 94

Solution: Ordering the test scores from least to greatest, we get:

73, 77, 84, 87, 89, 91, 94

Highest score – lowest score = 94 - 73 = 21

Answer: The range of these test scores is 21 points.

Mode

The **mode** of a set of data values is the value(s) that occurs most often.

The mode has applications in printing. For example, it is important to print more of the most popular books; because printing different books in equal numbers would cause a shortage of some books and an oversupply of others.

Likewise, the mode has applications in manufacturing. For example, it is important to manufacture more of the most popular shoes; because manufacturing different shoes in equal numbers would cause a shortage of some shoes and an oversupply of others.

Example

Find the mode of the following data set:

    48   44   48   45   42   49   48

Solution:

The mode is 48 since it occurs most often.

Note:

- It is possible for a set of data values to have more than one mode.
- If there are two data values that occur most frequently, we say that the set of data values is **bimodal**.
- If there is no data value or data values that occur most frequently, we say that the set of data values has no mode.

The students can refer to following link for Mean and Mode:

https://www.youtube.com/watch?v=NE6pudadmJY

EX 3.1 (Following questions will be done during the online class)

2. Organise 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.

3. Find the mean of the first five whole numbers.
4. A cricketer scores the following runs in eight innings:

                58, 76, 40, 35, 46, 45, 0, 100.

   Find the mean score.

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?

H.W.   EX.3.1 Q. 6, 7, 8, 9

BLOCK – 2

Median

The **median** of a set of data values is the middle value of the data set when it has been arranged in ascending order OR descending order.

Example 2

The marks of nine students in a geography test that had a maximum possible mark of 50 are given below:
   47   35   37   32   38   39   36   34   35

Find the median of this set of data values.

Solution:

Arrange the data values in order from the lowest value to the highest value:

32   34   35   35   36   37   38   39   47

The fifth data value, 36, is the middle value in this arrangement.

$\therefore$ Median $= 36$

Note:

- Half of the values in the data set lie below the median and half lie above the median.
- The median is the most commonly quoted figure used to measure property prices. The use of the median avoids the problem of the mean property price which is affected by a few expensive properties that are not representative of the general property market.

The mean, median and mode of a data set are collectively known as **measures of central tendency** as these three measures focus on where the data is centred or clustered. To analyse data using the mean, median and mode, we need to use the most appropriate measure of central tendency. The following points should be remembered:

- The mean is useful for predicting future results when there are no extreme values in the data set. However, the impact of extreme values on the mean may be important and should be considered. E.g. The impact of a stock market crash on average investment returns.
- The median may be more useful than the mean when there are extreme values in the data set as it is not affected by the extreme values.
- The mode is useful when the most common item, characteristic or value of a data set is required.

   The students can refer to following link:

   https://www.youtube.com/watch?v=EnL5KgSHbyY

EX.3.2. (Following questions would be done during the online class)

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

H.W. EX3.2. - Q. 1, 2

AAC ACTIVITY (To be done in class)

Students are supposed to collect data pertaining to runs scored by Virat Kohli in the IPL 2020 matches as the captain of Royal Challengers in the matches dated 21st September, 24th September, 28th September, 3rd October, and 5th October.

Compute average runs scored (MEAN) by Virat Kohli in these 5 matches and answer the questions that follow:

1) Is Average score (Mean) bigger than each observation?
2) Is the average score (Mean) smaller than each observation?
3) Is the average score one of the observations?
4) What do you think of Virat's performance on the basis of his mean runs scored?
5) Do you think Median and Mode would give a fair idea of his performance to the viewers? (Discuss)

Similarly, students will be motivated to create examples and see which measure of central tendency can be used there. Example: A shopkeeper selling shirts has range of sizes of shirts. To maximize his profit, he needs to buy shirts of sizes which are sold the most. Which concept can be used - MEAN, MEDIAN or MODE?

BLOCK – 3

READING OF BAR GRAPH

Choosing a Scale

We know that a bar graph is a representation of numbers using bars of uniform width and the lengths of the bars depend upon the frequency and the scale you have chosen. For example, in a bar graph where numbers in units are to be shown, the graph represents one unit length for one observation and if it has to show numbers in tens or hundreds, one unit length can represent 10 or 100 observations. Consider the following examples:

Example: Consider the following bar graph that represents the colour choices of students of a particular class:

Color choices of Students
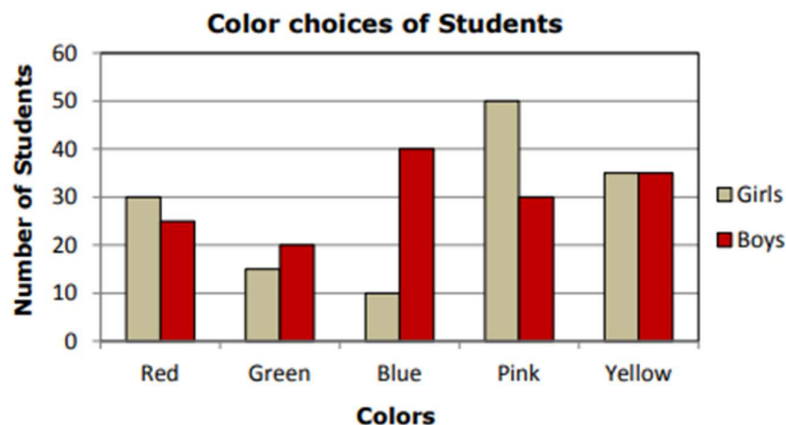
Answer the questions that follow:

1	How many girls like pink color?
2	Which color is equally liked by both girls and boys?
3	How many boys like blue color?
4	Find the total number of students who like red color.
5	Which color is liked by most of the girls?
6	What is the difference between the total number of boys who like blue and green color?

Answers:

1. 50 girls like pink colour.

2. Yellow

3. 40 boys

4. 30 girls + 25 boys = 55 students

5. Pink

6. No. of boys who like blue = 40

   No. of boys who like green = 20

Their difference = 40 - 20 = 20.

Drawing of a bar graph

1. Decide what title you will give to the graph.

2. Decide if you want horizontal or vertical bars.

3. Choose a scale.

4. Put a label on the axes.

5. Draw the bars.

Example

- Using the table shown below, let us construct a double bar chart. We will follow all steps outlined above in order to construct the double bar graph.

Scores on the practice Test and the Test		
Students	Practice Test	Test
Jeff	60	70
Peter	75	90
John	55	55
Mary	80	95

1. The title can be clearly seen from the table. It is scores on a practice test (pre-test) and a test.

2. We will choose vertical bars.

3. Since the scores differ from one another mostly by 5, 10, 15, or 20, it make sense to choose a scale of 10.

If the variation between scores were like 1, 2, 3, 4, or 5, it would have been better to choose a scale of 1 or 2.

4. We can put the names of the students on the x axis and the scores on the y axis. If we had decided to make horizontal bars, we would have put the names of the students on the y axis and the scores on the x axis.

5. Finally, we draw bars. The double bar graph is shown below:
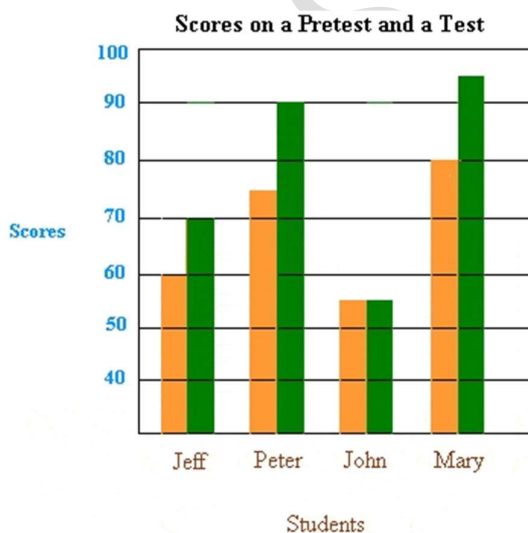
The students can refer to the following link for Reading and Drawing of Bar graphs:
https://www.youtube.com/watch?v=bz3K3pbTxT4

EX. 3.3 (Following questions will be done in class)

1. Use the bar graph (Fig 3.3) to answer the following questions.

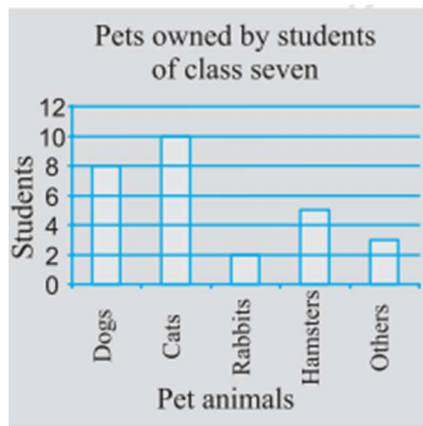   (a) Which is the most popular pet?   (b) How many students have dog as a pet?

Fig 3.3

Q.2. (From 'try these')

The bar graph (Fig 3.2) shows the result of a survey to test water resistant watches made by different companies.

Each of these companies claimed that their watches were water resistant. After a test the above results were revealed.
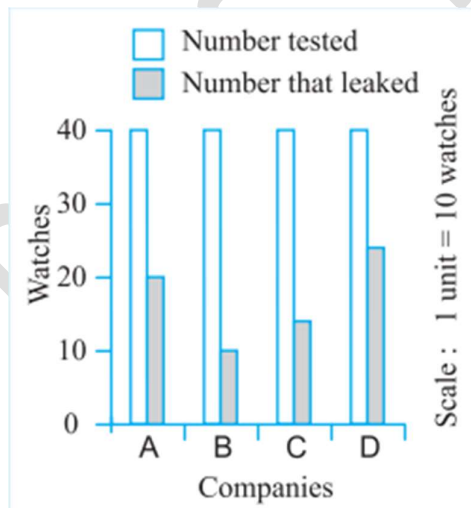

Fig 3.2

(a) Can you work out a fraction of the number of watches that leaked to the number tested for each company?

(b) Could you tell on this basis which company has better watches?

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

Favourite Sport	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 most popular?

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

H.W. - EX 3.3. Q 2, 3, 4

SUMMARY (key Points to remember)

1. The collection, recording and presentation of data help us organise our experiences and draw inferences from them.
2. Before collecting data we need to know what we would use it for.
3. The data that is collected needs to be organised in a proper table, so that it becomes easy to understand and interpret.
4. Average is a number that represents or shows the central tendency of a group of observations or data.
5. Arithmetic mean is one of the representative values of data.
6. Mode is another form of central tendency or representative value. The mode of a set of observations is the observation that occurs most often.
7. Median is also a form of representative value. It refers to the value which lies in the middle of the data with half of the observations above it and the other half below it.
8. A bar graph is a representation of numbers using bars of uniform widths.
9. Double bar graphs help to compare two collections of data at a glance.

Online Practice (only to be done online)
1)https://mathsmadeeasy.co.uk/tests/mean-median-mode-and-range-online-test/part-01-2/

2) https://www.proprofs.com/quiz-school/quizshow.php?title=test-mean-median-mode-range&q=1
3) https://www.khanacademy.org/math/statistics-probability/summarizing-quantitative-data/mean-median-basics/e/mean_median_and_mode

Assignment
Fill in the boxes in outer layer with a number such that when it takes the place of '? '
in the middle box, makes the inference of that particular leg true:

Average and Range Spider 1

Mean = 4.6

Mode = 6

Mode = 4

Range = 4

5,3,4,6,?

Median = 4

Mean = 6

Median = 5

Mean = 5
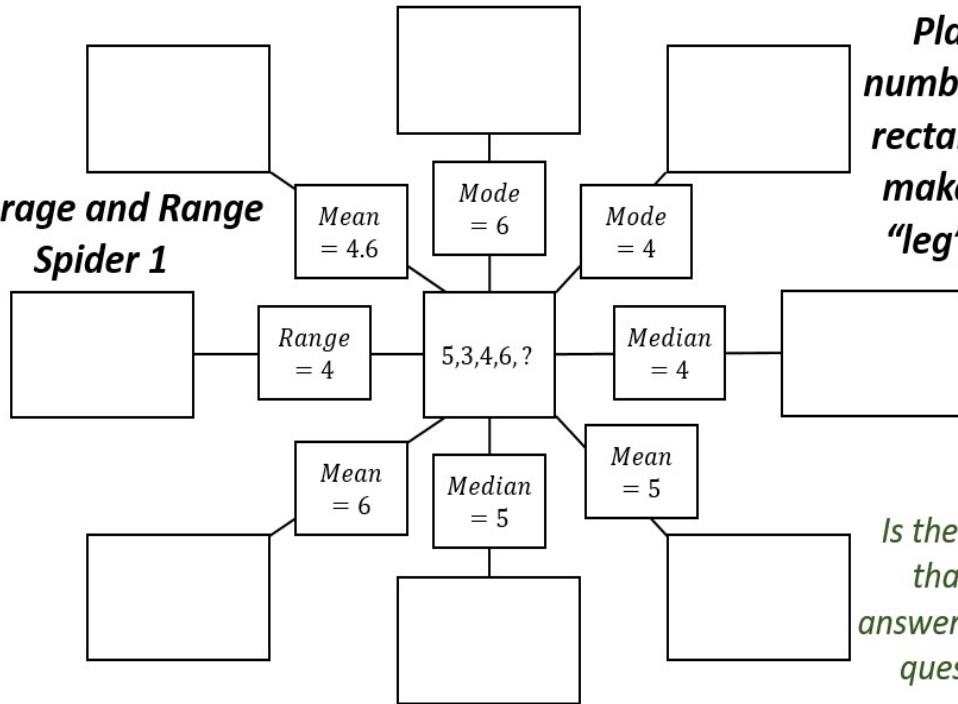
Is there more than one answer for some questions?

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