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UNIT 3

</div>

DATA HANDLING

(A) Main Concepts and Results

- The information collected in the form of numbers is called **Data**.
- Data is organised and represented graphically so that it becomes easy to understand and interpret.
- The difference between the highest and lowest observations in a given data is called its **Range**.
- The average or **Arithmetic Mean** or mean of a given data is defined as :

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Number of observations}}$$

- **Mode** is the observation that occurs most frequently in the data.
- If each of the values in a data are occurring one time (or equal number of times), then all are mode. Sometimes, we also say that this data has no mode since none of them is occurring frequently.
- When the given data is arranged in ascending (or descending) order, then the middle most observation is the **median** of the data.
- Mean, median and mode are the representative values of a group of observations. They are also called the **measures of central tendency** of the data.
- The representation of the data in the form of rectangles (bars) of uniform width is called a **Bar Graph**.
- A **double bar graph** can be used to compare informations related to two data.
- The situation that may or may not happen, have a chance of happening.

- The probablity of an event which is certain to happen is '1'.
- The probability of an event which is impossible to happen is '0'.
- The probability of an event

$$= \frac{\text{Number of outcomes favourable to the event}}{\text{Total number of outcomes in the experiment}}$$

(B) Solved Examples

In Examples 1 to 3, there are four options, out of which only one is correct. Write the correct answer.

Example 1: The range of the data 14, 6, 12, 17, 21, 10, 4, 3 is

(a) 21   (b) 17   (c) 18   (d) 11

Solution: Correct answer is (c)

Example 2: The mode of the data 23, 26, 22, 29, 23, 29, 26, 29, 22, 23 is

(a) 23 and 29   (b) 23 only

(c) 29 only   (d) 26 only

Solution: Correct answer is (a)

Example 3: The median of the data 40, 50, 99, 68, 98, 60, 94 is

(a) 40   (b) 60

(c) 68   (d) 99

Solution: Correct answer is (c)

In Examples 4 and 5, fill in the blanks to make the statements true.

Example 4: The mean of first five prime numbers is _____.

Solution: 5.6

[**Hint :** First five prime numbers are 2, 3, 5, 7 and 11]

Example 5: The probability of getting a number greater than 2 on throwing a die once is _____.

Solution: $\dfrac{2}{3}$

In Examples 6, 7 and 8, state whether the statements are True or False .

Example 6: The mode of the observations 23, 26, 15, 12, 28, 38, 19, 23, 26, 23 is 28.

Solution: False.

Example 7:

Size of Sweater	Number of Sweaters Sold
40	15
42	17
44	13
46	14
48	11
Total	**70**

In the above table

    (a) The most popular size is 17.

    (b) 17 is the median for above data.

Solution: (a) False

      (The numbers of sweater 17 tells us that 42 is the most common size. Thus, 17 is not mode rather 42 is mode.)

    (b) False

Example 8: Median of the data:

4, 5, 9, 2, 6, 8, 7 is 2

Solution: False

Example 9: Find the median of the data:

3, 11, 7, 2, 5, 9, 9, 2, 10, 15, 7

Solution: Arranging in ascending order.

2, 2, 3, 5, 7, 7, 9, 9, 10, 11, 15

Since number of observations is odd, the middle most value is the median. The middle most value is 7, so median is 7.

Example 10: Find the median of the data :

21, 15, 6, 25, 18, 13, 20, 9, 8, 12

Solution: Arranging in ascending order :

6, 8, 9, 12, 13, 15, 18, 20, 21, 25

Since number of observations is even, the median is given by finding the average or mean of the two middle most observations:

So, median = $\dfrac{13+15}{2}$ = $\dfrac{28}{2}$ = 14

Note : In this data, there are two middle most terms 13 and 15. So, median is the average of these observations.

Example 11: The cards bearing letters of the word "MATHEMATICS" are placed in a bag. A card is taken out from the bag without looking into the bag (at random).

(a) How many outcomes are possible when a letter is taken out of the bag at random?

(b) What is the probability of getting

(i) M?

(ii) Any vowel?

(iii) Any consonant?

(iv) X?

Solution: (a) There are 11 outcomes namely M, M, A, A, T, T, H, E, I, C, S.

(b) (i) Probability of getting 'M' = $\dfrac{2}{11}$

(ii) Probability of getting a vowel = $\dfrac{4}{11}$

(iii) Probability of getting a consonant = $\dfrac{7}{11}$

(iv) Probability of getting X = 0 = $\dfrac{0}{11}$

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Example 12: If the mean of 26, 28, 25, x, 24 is 27, find the value of x.

Solution: Mean $= \dfrac{\text{Sum of all observations}}{\text{Number of observations}}$

or, $27 = \dfrac{26 + 28 + 25 + x + 24}{5}$

or, $27 = \dfrac{103 + x}{5}$

or, $135 = 103 + x$

or, $x = 135 - 103$

So, $x = 32$

Example 13: The mean of 10 observations was calculated as 40. It was detected on rechecking that the value of 45 was wrongly copied as 15. Find the correct mean.

Solution: Mean $= \dfrac{\text{Sum of all observations}}{\text{Number of observations}}$

or, $40 = \dfrac{\text{Sum of all observations}}{10}$

So, sum of all observations $= 400$

But this is incorrect sum, since one observation was copied wrongly.

So, correct sum $=$ Incorrect sum $-$ Incorrect observation $+$ correct observation

$= 400 - 15 + 45$

$= 430$

Correct Mean $= \dfrac{\text{Correct Sum}}{\text{Number of observations}} = \dfrac{430}{10} = 43$

Example 14: The median of observations 11, 12, 14, 18, $x + 2$, 20, 22, 25, 61 arranged in ascending order is 21. Find the value of x.

Solution: Median from data $= x + 2$

or, $21 = x + 2$

or, $x = 21 - 2$

or, $x = 19$

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Example 15: Study the double bar graph given below and answer the questions that follow:
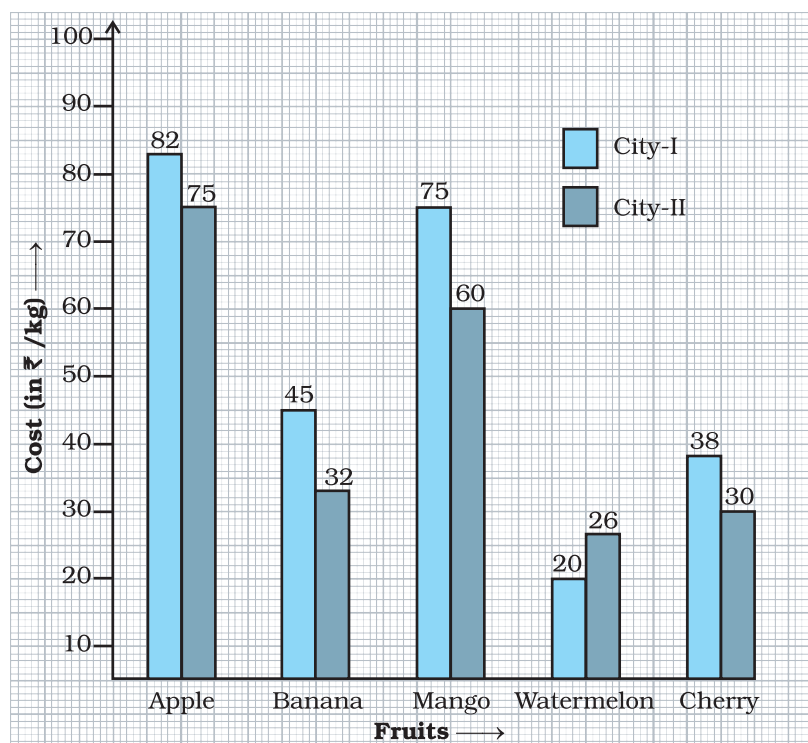

Fig. 3.1

(a) What information does the above double graph depict?

(b) Name the fruits for which cost of 1 kg is greater in City I as compared to City II.

(c) What is the difference of rates for apples in both the cities?

(d) Find the ratio of the cost of mangoes per kg in City I to the cost of mangoes per kg in City II.

Solution:

(a) The double bar graph compares the cost of different fruits per kg in Cities I and II.

(b) Apple, Banana, Mango and Cherry.

(c) Since ₹ 82 – ₹ 75 = ₹ 7 therefore, in both the cities the difference of rates of apples is ₹ 7/kg.

(d) ₹ 75 : ₹ 60 = 5 : 4

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Example 16: The following double bar graph represents test matches results summary for Cricket Team of country X against different countries:
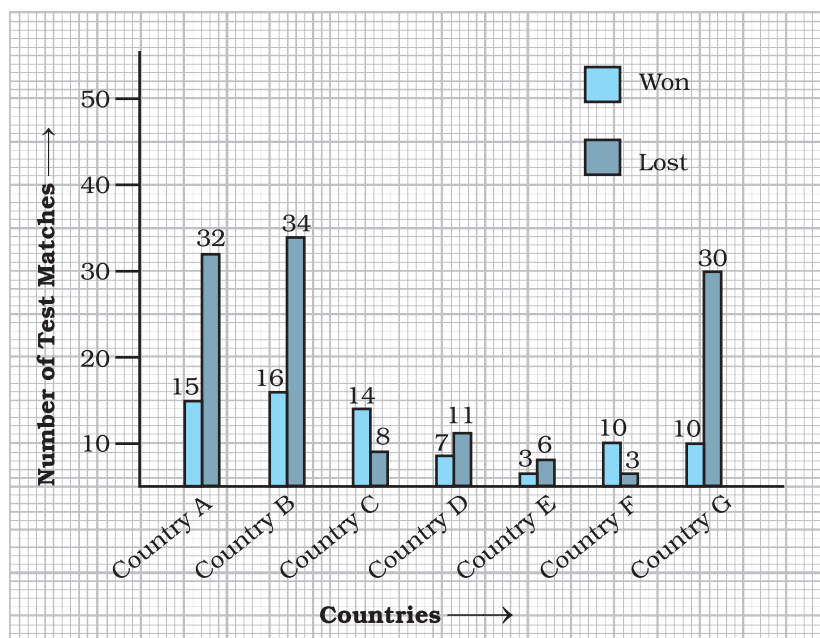

Fig. 3.2

Use the bar graph to answer the following questions:

(a) Which country has managed maximum wins against country X?

(b) The difference between the number of matches won and lost is highest for which country against country X?

(c) Number of wins of country E is the same as number of losses of which country against country X?
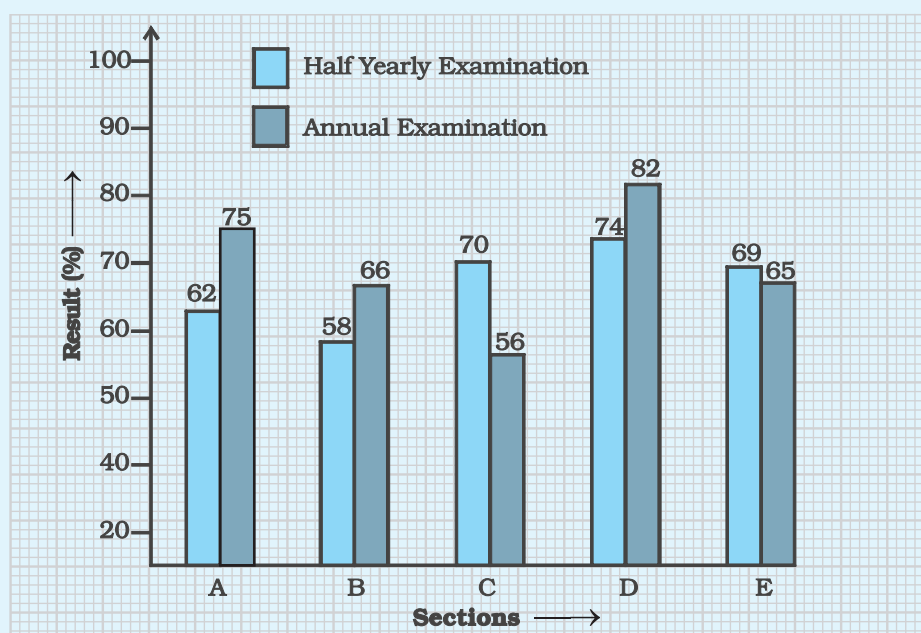
Solution: (a) Country B   (b) Country G   (c) Country F

Application on Problem Solving Strategy

Example 17

The double bar graph given below compares the class-averages in half yearly and annual examinations of 5 sections of Class VII.

Observe the graph carefully and tell which section showed the most improvement and by how much?

Solution:

Understand and Explore the Problem

- What information is given in the question?

  The average result of half yearly and annual examinations of 5 different sections of Class VII are compared.

- What are you trying to find?

  The section of Class VII that has showed the most improvement and the per cent of improvement shown.

Plan a Strategy

- Observe the graph and find out the sections in which the annual examination result is more than the half yearly result.

  Improvement is in these sections only.

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- Then only for these sections, compare the results graphically and locate the section for which the difference of results is the maximum.
- For this section, find the difference of the results.

Solve

- The sections in which the results of annual examination is more than half yearly examination are sections A, B and D.
- Observing the graph of these sections we locate that section A has the maximum difference between the results.

The difference of results of section A = 75 – 62 = 13

Hence, section A has shown the maximum improvement and it is 13 per cent.

Revise

- Find the difference of the annual examination results and the half yearly examination results for each section.

  Difference in results of section A = 75 – 62 = 13

  Difference in results of section B = 66 – 58 = 8

  Difference in results of section C = 56 – 70 = –14

  Difference in results of section D = 82 – 74 = 8

  Difference in results of section E = 65 – 69 = – 4

We see that the difference is maximum for Section A and the difference is 13, which is same as our answer.

Think and Discuss

1. **Can you compare** the ratio of difference of results of Sections B and D?

2. **From the graph**, can you observe the sections where there was no improvement?

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(C) EXERCISE

In Questions 1 to 16, there are four options, out of which only one is correct. Write the correct answer.

1. Let x, y, z be three observations. The mean of these observations is

(a) $\dfrac{x \times y \times z}{3}$ 　　 (b) $\dfrac{x + y + z}{3}$ 　 (c) $\dfrac{x - y - z}{3}$ 　 (d) $\dfrac{x \times y + z}{3}$

2. The number of trees in different parks of a city are 33, 38, 48, 33, 34, 34, 33 and 24. The mode of this data is

(a) 24 　　　　　 (b) 34 　　　　　 (c) 33 　　　　　 (d) 48

3. Which measures of central tendency get affected if the extreme observations on both the ends of a data arranged in descending order are removed?

(a) Mean and mode 　　　　　　 (b) Mean and Median

(c) Mode and Median 　　　　　　 (d) Mean, Median and Mode

4. The range of the data : 21, 6, 17, 18, 12, 8, 4, 13 is

(a) 17 　　　　　 (b) 12 　　　　　 (c) 8 　　　　　 (d) 15

5. The median of the data : 3, 4, 5, 6, 7, 3, 4 is

(a) 5 　　　　　 (b) 3 　　　　　 (c) 4 　　　　　 (d) 6

6. Out of 5 brands of chocolates in a shop, a boy has to purchase the brand which is most liked by children. What measure of central tendency would be most appropriate if the data is provided to him?

(a) Mean 　　　　　　　　　 (b) Mode

(c) Median 　　　　　　　　　 (d) Any of the three

7. There are 2 aces in each of the given set of cards placed face down. From which set are you certain to pick the two aces in the first go?

(a) 　　　　　　　　 (b)

(c) 　　　　　　　　 (d)

8. In the previous question, what is the probability of picking up an ace from set (d)?

(a) $\dfrac{1}{6}$ (b) $\dfrac{2}{6}$ (c) $\dfrac{3}{6}$ (d) $\dfrac{4}{6}$

9. The difference between the highest and the lowest observations in a data is its

(a) frequency   (b) width   (c) range   (d) mode

10. In a school, only 2 out of 5 students can participate in a quiz. What is the chance that a student picked at random makes it to the competition?

(a) 20%   (b) 40%   (c) 50%   (d) 30%

11. Some integers are marked on a board. What is the range of these integers?

(a) 31   (b) 37

(c) 20   (d) 3

0	15
−11	−17
+20	
6	− 4

Fig. 3.3

12. On tossing a coin, the outcome is

(a) only head

(b) only tail

(c) neither head nor tail

(d) either head or tail

13. The mean of three numbers is 40. All the three numbers are different natural numbers. If lowest is 19, what could be highest possible number of remaining two numbers?

(a) 81   (b) 40   (c) 100   (d) 71

14. Khilona earned scores of 97, 73 and 88 respectively in her first three examinations. If she scored 80 in the fourth examination, then her average score will be

(a) increased by 1   (b) increased by 1.5

(c) decreased by 1   (d) decreased by 1.5

15. Which measure of central tendency best represents the data of the most popular politician after a debate?

(a) Mean   (b) Median
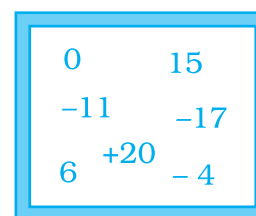
(c) Mode   (d) Any of the above

16. Which of the following has the same mean, median and mode?

(a) 6, 2, 5, 4, 3, 4, 1   (b) 4, 2, 2, 1, 3, 2, 3

(c) 2, 3, 7, 3, 8, 3, 2   (d) 4, 3, 4, 3, 4, 6, 4

In Questions 17 to 31, fill in the blanks to make the statements true.

17. The difference between the highest and the lowest observations of a data is called _____.

18. The mean of a data is defined as _____.

19. In a set of observations, the observation that occurs the most often is called _____.

20. In a given data, arranged in ascending or descending order, the middle most observation is called _____.

21. Mean, Median, Mode are the measures of _____.

22. The probability of an event which is certain to happen is _____.

23. The probability of an event which is impossible to happen is _____.

24. When a die is thrown, the probability of getting a number less than 7 is _____.

25. In Throwing a die the number of possible outcomes is _____.

26. _____ can be used to compare two collections of data.

27. The representation of data with bars of uniform width is called _____.

28. If the arithmetic mean of 8, 4, x, 6, 2, 7 is 5, then the value of x is _____.

29. The median of any data lies between the _____ and _____ observations.

30. Median is one of the observations in the data if number of observations is _____.

Think and Discuss

What is the difference between a bar graph and a histogram.

31. Rohit collected the data regarding weights of students of his class and prepared the following table:

Weight (in kg)	44 – 47	48 – 51	52 – 55	56 – 60
Number of Students	3	5	25	7

A student is to be selected randomly from his class for some competition. The probability of selection of the student is highest whose weight is in the interval _____.

In Questions 32 to 49, state whether the statements are True or False.

32. If a die is thrown, the probability of getting a number greater than 6 is 1.

33. When a coin is tossed, there are 2 possible outcomes.

34. If the extreme observations on both the ends of a data arranged in ascending order are removed, the median gets affected.

35. The measures of central tendency may not lie between the maximum and minimum values of data.

36. It is impossible to get a sum of 14 of the numbers on both dice when a pair of dice is thrown together.

37. The probability of the spinning arrow stopping in the shaded region (Fig. 3.4) is $\frac{1}{2}$.

Fig. 3.4

38. A coin is tossed 15 times and the outcomes are recorded as follows :

H T T H T H H H T T H T H T T. The chance of occurence of a head is 50 per cent.

39. Mean, Median and Mode may be the same for some data.

40. The probability of getting an ace out of a deck of cards is greater than 1.

41. Mean of the data is always from the given data.

42. Median of the data may or may not be from the given data.

43. Mode of the data is always from the given data.

44. Mean of the observations can be lesser than each of the observations.
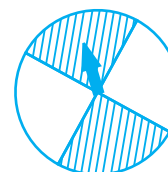
45. Mean can never be a fraction.

46. Range of the data is always from the data.

47. The data 12, 13, 14, 15, 16 has every observation as mode.

48. The range of the data 2, –5, 4, 3, 7, 6 would change if 2 was subtracted from each value in the data.

49. The range of the data 3, 7, 1, –2, 2, 6, –3, –5 would change if 8 was added to each value in the data.

50. Calculate the Mean, Median and Mode of the following data:

5, 10, 10, 12, 13.

Are these three equal ?

51. Find the mean of the first ten even natural numbers.

52. A data constitutes of heights (in cm) of 50 children. What do you understand by mode for the data?

53. A car seller collects the following data of cars sold in his shop.

Colour of Car	Number of Cars Sold
Red	15
Black	20
White	17
Silver	12
Others	9

(a) Which colour of the car is most liked?

(b) Which measure of central tendency was used in (a)?

54. The marks in a subject for 12 students are as follows:

31, 37, 35, 38, 42, 23, 17, 18, 35, 25, 35, 29

For the given data, find the

(a) Range   (b) Mean   (c) Median   (d) Mode

55. The following are weights (in kg) of 12 people.

70, 62, 54, 57, 62, 84, 75, 59, 62, 65, 78, 60

(a) Find the mean of the weights of the people.

(b) How many people weigh above the mean weight?

(c) Find the range of the given data.

56. Following cards are put facing down:

A E I O U

What is the chance of drawing out

(a) a vowel   (c) a card marked U

(b) A or I   (d) a consonant

57. For the given data given below, calculate the mean of its median and mode.

6, 2, 5, 4, 3, 4, 4, 2, 3

58. Find the median of the given data if the mean is 4.5.

5, 7, 7, 8, x, 5, 4, 3, 1, 2

59. What is the probability of the sun setting tomorrow?

60. When a spinner with three colours (Fig. 3.5) is rotated, which colour has more chance to show up with arrow than the others?

Fig. 3.5

61. What is the probability that a student chosen at random out of 3 girls and 4 boys is a boy?

62. The letters written on paper slips of the word MEDIAN are put in a bag. If one slip is drawn randomly, what is the probability that it bears the letter D?

63. Classify the following events as certain to happen, impossible to happen, may or may not happen:

(a) Getting a number less than 1 on throwing a die.
(b) Getting head when a coin is tossed.
(c) A team winning the match.
(d) Christmas will be on 25 December.
(e) Today moon will not revolve around the earth.
(f) A ball thrown up in the air will fall down after some time.

64. A die was thrown 15 times and the outcomes recorded were

5, 3, 4, 1, 2, 6, 4, 2, 2, 3, 1, 5, 6, 1, 2

Find the mean, median and mode of the data.

65. Find the mean of first six multiples of 4.

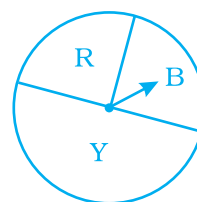**66.** Find the median of first nine even natural numbers.

67. The mean of three numbers is 10. The mean of other four numbers is 12. Find the mean of all the numbers.

68. Find the mode of the given data:

10, 8, 4, 7, 8, 11, 15, 8, 4, 2, 3, 6, 8

69. Given below are heights of 15 boys of a class measured in cm:

128, 144, 146, 143, 136, 142, 138, 129, 140, 152, 144, 140, 150, 142, 154.

Find

(a) The height of the tallest boy.

(b) The height of the shortest boy.

(c) The range of the given data.

(d) The median height of the boys.

70. Observe the data and answer the questions that follow:

16, 15, 16, 16, 8, 15, 17

(a) Which data value can be put in the data so that the mode remains the same?

(b) At least how many and which value(s) must be put in to change the mode to 15?

(c) What is the least number of data values that must be put in to change the mode to 17? Name them.

71. Age (in years) of 6 children of two groups are recorded as below:

Age (in Years)	
Group A	Group B
7	7
7	9
9	11
8	12
10	12
10	12

(a) Find the mode and range for each group.

(b) Find the range and mode if the two groups are combined together.

Measures of central tendency are used to describe the middle of a data set. Mean, median, and mode are measures of central tendency.

Measures of Central Tendency and Range

	Description
Mean	To find the mean (average), add the values in the data set. Then divide by the number of values in the set.
Median	The middle value or the mean of the two middle values, in an ordered (ascending or descending) set of data.
Mode	The value(s) that occur most frequently.
Range	The difference between the least and the greatest values in a data set.

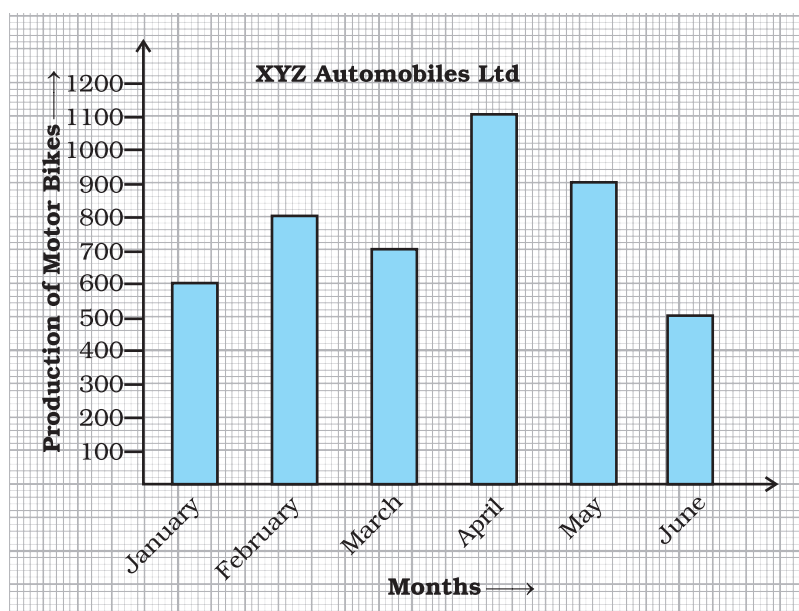**72.** Observe the given bar graph carefully and answer the questions that follow.

Fig. 3.6

(a) What information does the bar graph depict?

(b) How many motor bikes were produced in the first three months?

(c) Calculate the increase in production in May over the production in January.

(d) In which month the production was minimum and what was it?

(e) Calculate the average (mean) production of bikes in 6 months.

73. The bar graph given below shows the marks of students of a class in a particular subject:

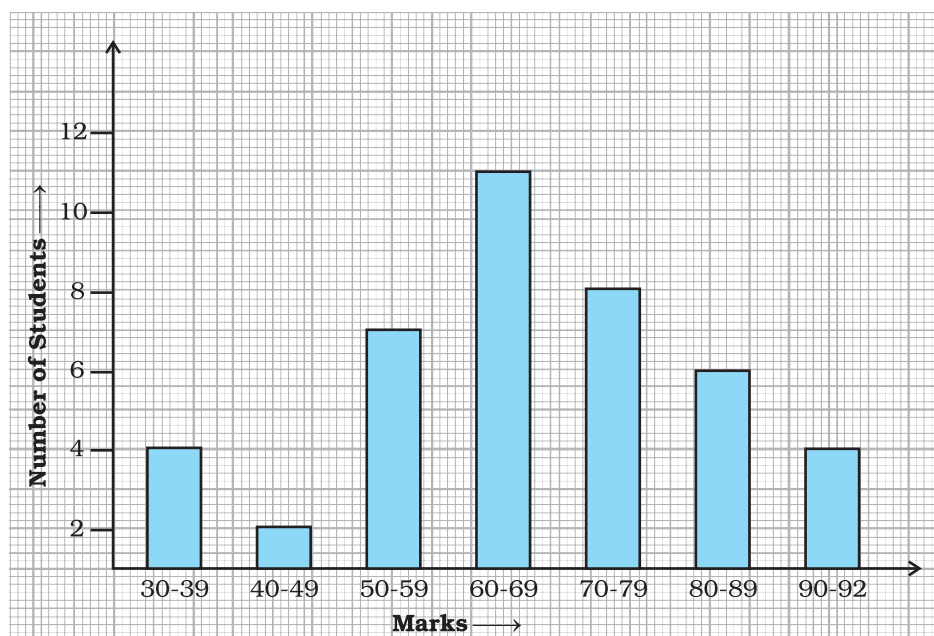*Fig. 3.7*

Study the bar graph and answer the following questions:

(a) If 40 is the pass mark, then how many students have failed?

(b) How many students got marks from 50 to 69?

(c) How many students scored 90 marks and above?

(d) If students who scored marks above 80 are given merits then how many merit holders are there?

(e) What is the strength of the class?

74. Study the bar graph given below and answer the questions that follow.

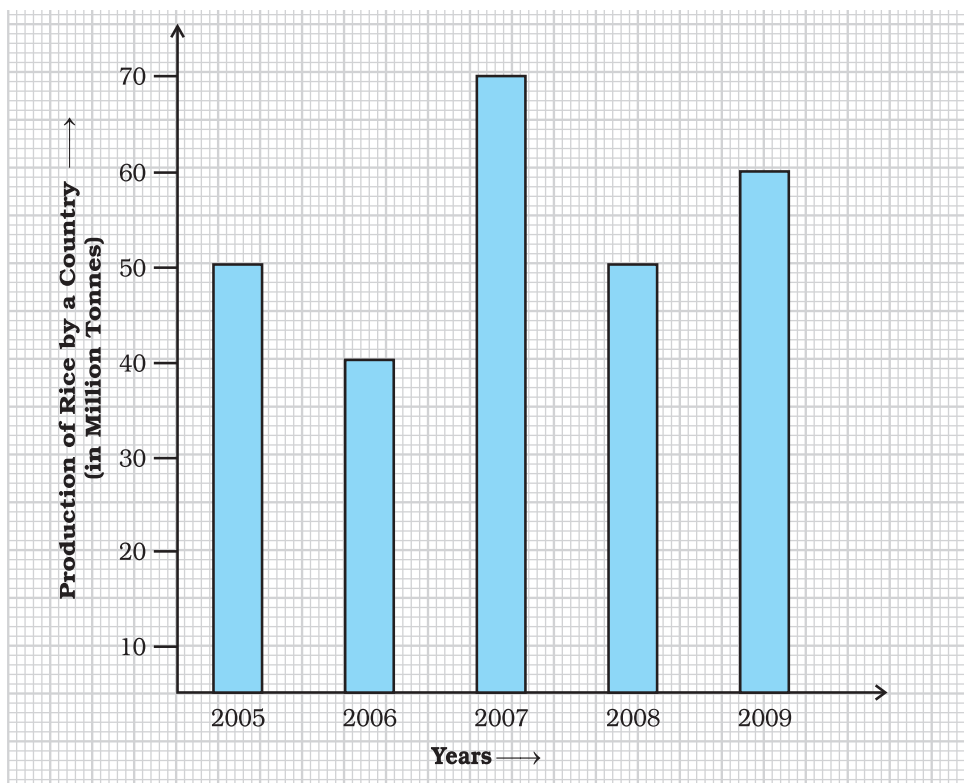*Fig. 3.8*

(a) What information does the above bar graph represent?

(b) In which year was production the least?

(c) After which year was the maximum rise in the production?

(d) Find the average production of rice during the 5 years.

(e) Find difference of rice production between years 2006 and 2008.

Vocabulary Connections

To become familiar with some of the vocabulary terms in the chapter, fill up the following:
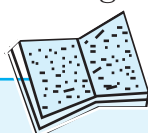
Vocabulary

1. The population of an area is the total number of people living in that area. What might _____ mean in the process of gathering data?

2. The word median is derived from the Latin word medius, meaning "middle," What might the _____ value in a set of data be?

3. When you sample a food, you taste a small portion. What might a _____ be in data collection?

- Population
- Median
- Sample

75. Study the bar graph given below and answer the questions that follow :
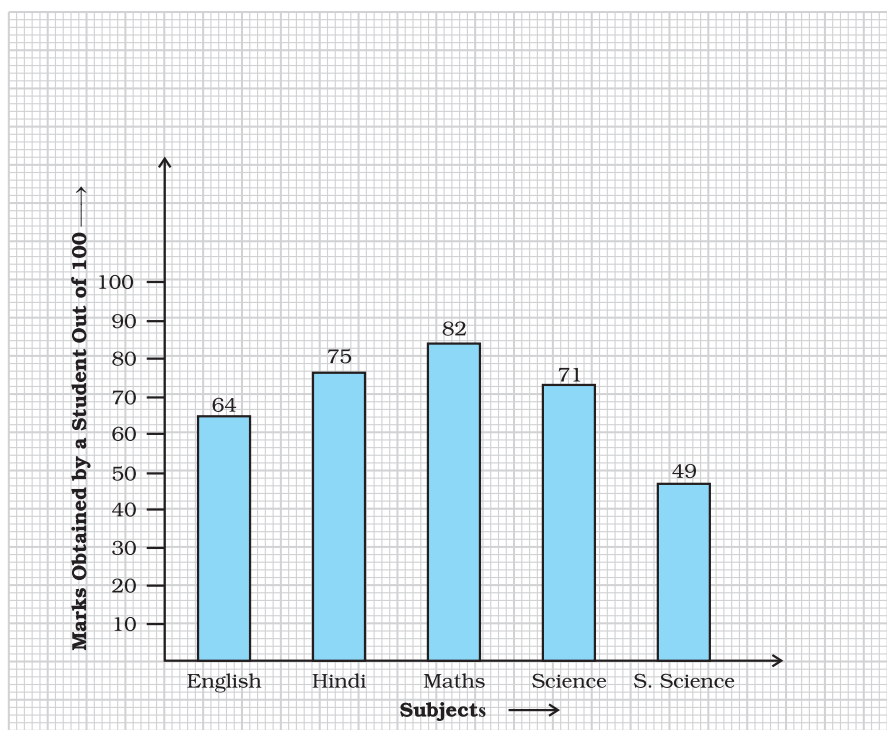
Fig. 3.9

(a) What information is depicted from the bar graph?

(b) In which subject is the student very good?

(c) Calculate the average marks of the student.

(d) If 75 and above marks denote a distinction, then name the subjects in which the student got distinction.

(e) Calculate the percentage of marks the student got out of 500.

76. The bar graph given below represents the circulation of newspapers (dailies) in a town in six languages (the figures are approximated to hundreds).
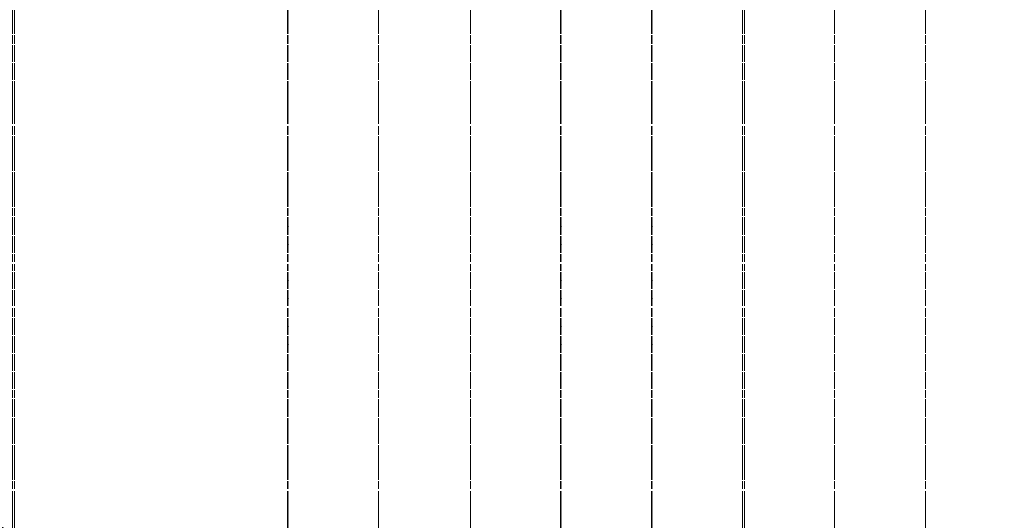
77. Study the double bar graphs given below and answer the following questions:

78. Study the double bar graph shown below and answer the questions that follow:
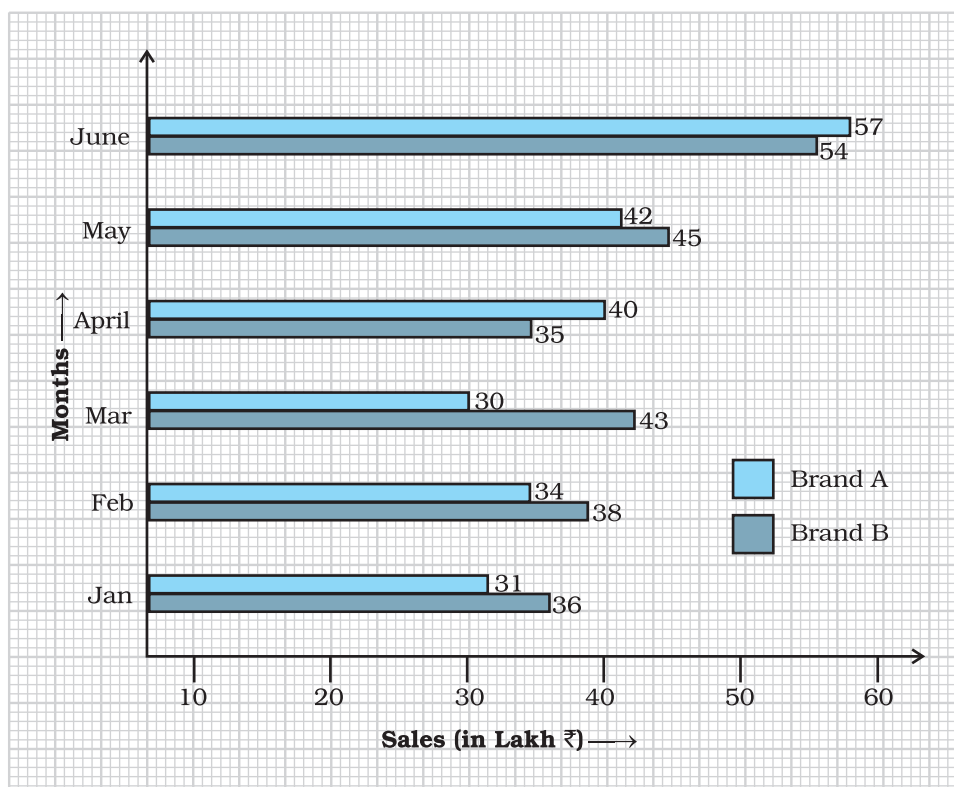
Fig. 3.12

(a) What information is represented by the above double bar graph?

(b) In which month sales of Brand A decreased as compared to the previous month?

(c) What is the difference in sales of both the Brands for the month of June?

(d) Find the average sales of Brand B for the six months.

(e) List all months for which the sales of Brand B was less than that of Brand A.

(f) Find the ratio of sales of Brand A as compared to Brand B for the month of January.

79. Study the double bar graph given below and answer the questions that follow:
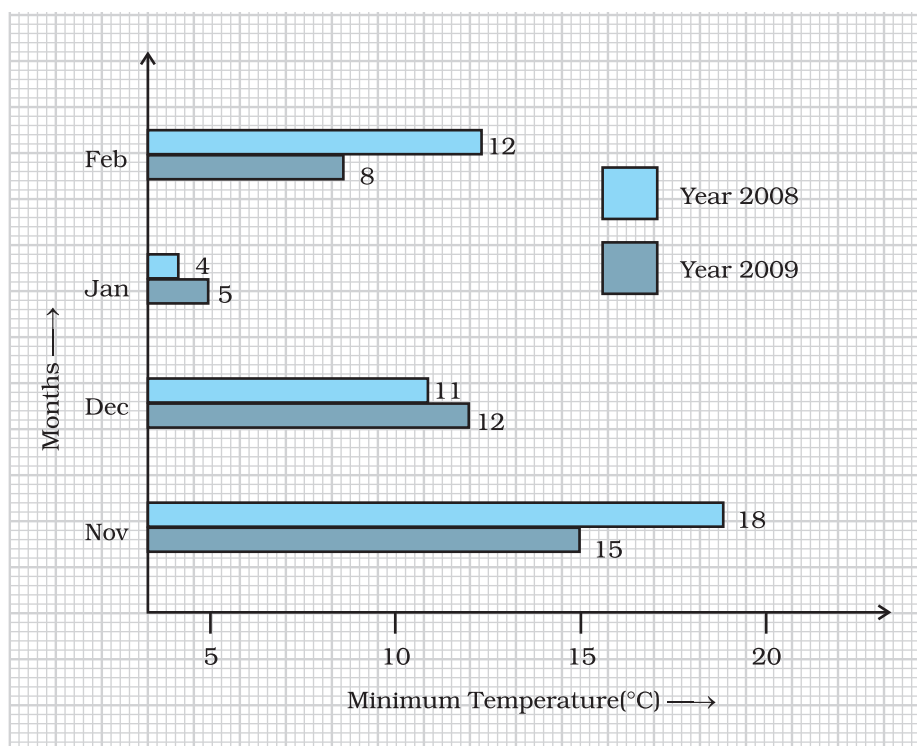
Fig. 3.13

(a) What information is compared in the above given double bar graph?

(b) Calculate the ratio of minimum temperatures in the year 2008 to the year 2009 for the month of November.

(c) For how many months was the minimum temperature in the year 2008 greater than that of year 2009? Name those months.

(d) Find the average minimum temperature for the year 2008 for the four months.

(e) In which month is the variation in the two temperatures maximum?

80. The following table shows the average intake of nutrients in calories by rural and urban groups in a particular year. Using a suitable scale for the given data, draw a double bar graph to compare the data.

Foodstuff	Rural	Urban
Pulses	35	49
Leafy vegetables	14	21
Other vegetables	51	89
Fruits	35	66
Milk	70	250
Fish and flesh foods	10	22
Fats and Oils	9	35
Sugar/Jaggery	19	31

81. Study the double bar graph and answer the quesions that follow:

Fig. 3.14

(a) What information does the double bar graph represent?

(b) Find the total number of boys in all sections of Class VII.

(c) In which sections, the number of girls is greater than the number of boys?

(d) In which section, the number of boys is the maximum?

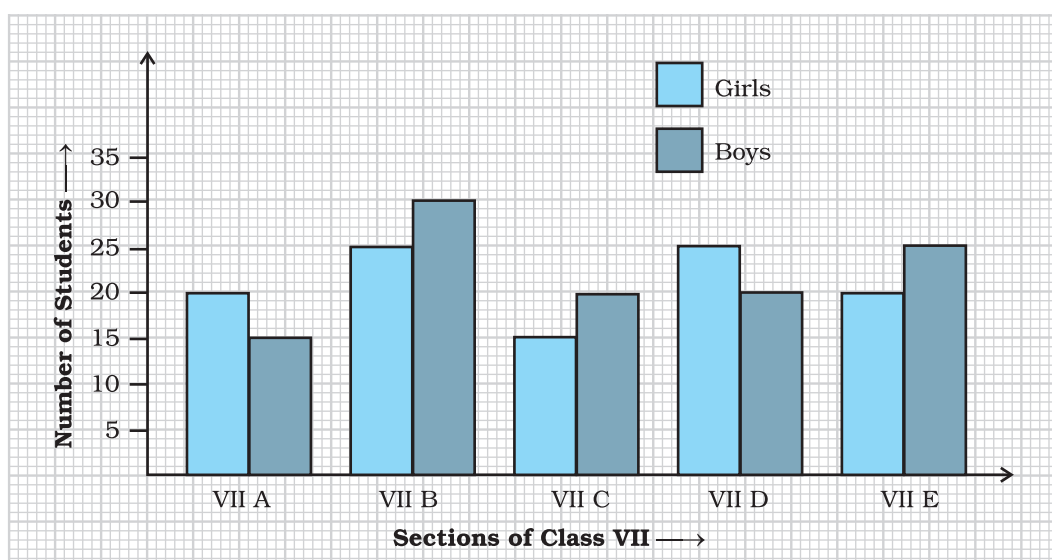(e) In which section, the number of girls is the least?

82. In a public library, the following observations were recorded by the librarian in a particular week:

Days	Mon	Tues	Wed	Thurs	Fri	Sat
Newspaper Readers	400	600	350	550	500	350
Magazine Readers	150	100	200	300	250	200

(a) Draw a double bar graph choosing an appropriate scale.

(b) On which day, the number of readers in the library was maximum?

(c) What is the mean number of magazine readers?

83. Observe the following data:

Government School, Chandpur		
Daily Attendance		Date : 15.4.2009
Class	Total Students	Number of Students Present on that Day
VI	90	81
VII	82	76
VIII	95	91
IX	70	65
X	63	62

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

(b) Which class has the maximum number of students?

(c) In which class, the difference of total students and number of students present is minimum?

(d) Find the ratio of number of students present to the total number of students of Class IX.

(e) What per cent of Class VI students were absent?

Plan a Strategy

- Identify too much/too little Information.

  When you read a problem, you must decide if the problem has too much or too little information. If the problem has too much information, you must decide what information to use to solve the problem. If the problem has too little information, then you should determine what additional information you need to solve the problem.

- Read the problems below and decide if there is too much or too little information in each problem. If there is too much information, tell what information you would use to solve the problem. If there is too little information, tell what additional information you would need to solve the problem.

- On Monday, 20 students took an examination. There were 10 students who scored above 85 and 10 students who scored below 85. What was the average score?

- Aayesha is practising for a marathon. She ran for 50 minutes on Monday, 70 minutes on Wednesday, and 45 minutes on Friday. On Tuesday and Thursday, she lifted weights at the gym for 45 minutes each day. She swam for 45 minutes over the weekend. What was the average amount of time per day Aayesha spent running last week?

84. Observe the given data:

Days of the Week	Mon	Tues	Wed	Thurs	Fri	Sat
Number of Mobile Phone Sets Sold	50	45	30	55	27	60

(a) Draw a bar graph to represent the above given information.

(b) On which day of the week was the sales maximum?

(c) Find the total sales during the week.

(d) Find the ratio of the minimum sale to the maximum sale.

(e) Calculate the average sale during the week.

(f) On how many days of the week was the sale above the average sales?

85. Below is a list of 10 tallest buildings in India.

This list ranks buildings in India that stand at least 150m (492 ft.) tall, based on standard height measurement. This includes spires and architectural details but does not include antenna marks. Following data is given as per the available information till 2009. Since new buildings are always under construction, go on-line to check new taller buildings.

Use the information given in the table about sky scrapers to answer the following questions:

Name	City	Height	Floors	Year
Planet	Mumbai	181m	51	2009
UB Tower	Bengaluru	184 m	20	2006
Ashok Towers	Mumbai	193 m	49	2009
The Imperial I	Mumbai	249 m	60	2009
The Imperial II	Mumbai	249 m	60	2009
RNA Mirage	Mumbai	180 m	40	2009
Oberoi Woods Tower I	Mumbai	170 m	40	2009
Oberoi Woods Tower II	Mumbai	170 m	40	2009
Oberoi Woods Tower III	Mumbai	170 m	40	2009
MVRDC	Mumbai	156 m	35	2002

(a) Find the height of each storey of the three tallest buildings and write them in the following table:

Building	Height	Number of Storeys	Height of Each Storey

(b) The average height of one storey for the buildings given in (a) is _____.

(c) Which city in this list has the largest percentage of skyscrappers? What is the percentage?

(d) What is the range of data?

(e) Find the median of the data.

(f) Draw a bar graph for given data.

86. The marks out of 100 obtained by Kunal and Soni in the Half Yearly Examination are given below:

Subjects	English	Hindi	Maths	Science	S. Science	Sanskrit
Kunal	72	81	92	96	64	85
Soni	86	89	90	82	75	82

(a) Draw a double bar graph by choosing appropriate scale.

(b) Calculate the total percentage of marks obtained by Soni.

(c) Calculate the total percentage of marks obtained by Kunal.

(d) Compare the percentages of marks obtained by Kunal and Soni.

(e) In how many subjects did Soni get more marks than Kunal? Which are those subjects?

(f) Who got more marks in S. Science and what was the difference of marks?

(g) In which subject the difference of marks was maximum and by how much?

87. The students of Class VII have to choose one club from Music, Dance, Yoga, Dramatics, Fine arts and Electronics clubs. The data given below shows the choices made by girls and boys of the class. Study the table and answer the questions that follow:

Clubs	Music	Dance	Yoga	Dramatics	Fine Arts	Electronics
Girls	15	24	10	19	27	21
Boys	12	16	8	17	11	30

(a) Draw a double bar graph using appropriate scale to depict the above data.

(b) How many students are there in Class VII?

(c) Which is the most preferred club by boys?

(d) Which is the least preferred club by girls?

(e) For which club the difference between boys and girls is the least?

(f) For which club is the difference between boys and girls the maximum?

88. The data given below shows the production of motor bikes in a factory for some months of two consecutive years.

Months	Feb	May	August	October	December
2008	2700	3200	6000	5000	4200
2007	2800	4500	4800	4800	5200

Study the table given above and answer the following questions:

(a) Draw a double bar graph using appropriate scale to depict the above information and compare them.

(b) In which year was the total output the maximum?

(c) Find the mean production for the year 2007.

(d) For which month was the difference between the production for the two years the maximum?

(e) In which month for the year 2008, the production was the maximum?

(f) In which month for the year 2007, the production was the least?

89. The table below compares the population (in hundreds) of 4 towns over two years:

Towns	A	B	C	D
2007	2900	6400	8300	4600
2009	3200	7500	9200	6300

Study the table and answer the following questions:

(a) Draw a double bar graph using appropriate scale to depict the above information.

(b) In which town was the population growth maximum?

(c) In which town was the population growth least?

90. The table below gives the data of tourists visiting 5 hill stations over two consecutive years. Study the table and answer the questions that follow:

Hill stations	Nainital	Shimla	Manali	Mussoorie	Kullu
2008	4000	5200	3700	5800	3500
2009	4800	4500	4200	6200	4600

(a) Draw a double bar graph to depict the above information using appropriate scale.

(b) Which hill station was visited by the maximum number of tourists in 2008?

(c) Which hill station was visited by the least number of tourists in 2009?

(d) In which hill stations was there increase in number of tourists in the year 2009?

91. The table below gives the flavours of ice cream liked by children (boys and girls) of a society.

Flavours	Vanilla	Chocolate	Strawberry	Mango	Butterscotch
Boys	4	9	3	8	13
Girls	8	12	7	9	10

Study the table and answer the following questions:

(a) Draw a double bar graph using appropriate scale to represent the above information.

(b) Which flavour is liked the most by the boys?

(c) How many girls are there in all?

(d) How many children like chocolate flavour of ice cream?

(e) Find the ratio of children who like strawberry flavour to vanilla flavour of ice cream.

(D) Applications

Application 1: Create a table like the one shown

Object	Estimate (in cm)	Measure (in cm)
Length of a pen		
Length of an eraser		
Length of your palm		
Length of your geometry box		
Length of your math notebook		

Draw a double bar graph for the above. How accurate are your estimations?

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Application 2: The Body Mass Index (BMI) is a statistical measurement which compares an individual's weight and height. It is a very useful tool to estimate a healthy body weight based on how tall an individual is. Indeed, it is the most widely used tool to identify the weight problem. BMI is very easy to measure and evaluate. With the help of BMI, one can come to know whether one is underweight, normal weight, over weight or in the category of obesity. Its value is measured in kg/m^2.

BMI of any individual is calculated with the help of the following formula :

$$\text{Body Mass Index (BMI)} = \left(\frac{\text{Body Weight}}{\text{Height} \times \text{Height}} \right)$$

Here the weight of the individual is measured in kilograms and the height of that individual is taken in metres.

The categories in BMI are given in the following table :

Category	BMI
Under weight	<18.5
Normal weight	18.5 – 24.9
Over weight	25.0 – 29.9
Obesity Class I	30.0 – 34.9
Obesity Class II	35.0 – 39.9
Obesity Class III	40

After having a glance at the table given above, one can come to know the category in which any individual falls. Now fill the table given below using the data for the children of your class :

Sl. No.	Name of Student	Body Weight (in kg)	Height (in mtrs)	Value (BMI)	Cateogry

Also draw a bar graph for the data received.

Game 3: Collect the data from students of your class about their favourite programmes on television and prepare a table as shown below:

Sl.No.	Programmes	Number of Girls	Number of Boys
1.	Cartoons		
2.	Serials		
3.	Reality shows		
4.	Songs		
5.	Movies		
6.	News		
7.	Others		

(a) Represent the above information on a double bar graph using appropriate scale.

(b) Study the graph and find out the favourite programme of the most of students.

(c) Which programme is liked by most of the boys?

(d) Name the programme for which difference between likings of the number of boys and girls is the maximum.

(e) Calculate the percentage of boys who like to watch News.

(f) Calculate the percentage of girls who like to watch Cartoons.

Game 4: Throw a die 20 times and record the outcomes in the following table:

No. on Die	1	2	3	4	5	6
No. of Times (Frequency)						

Calculate the probability of getting the following numbers using your recorded data:

(i) 6

(ii) greater than 6

(iii) 3 or 4

Write about your observation about the certainty of getting any particular number by throwing a die.

Cross Word Puzzle 5

Solve the given crossword and then fill up the given blanks and then boxes. Clues are given below for across as well as downward filling. Also for across and down clues. Clue number is written at the corner of boxes. Answers of clues have to fill up their respective boxes.

Clues

Across

1. Arranging the collected data in tabular form is called _____ of data.

2. Mean is defined as sum of all observations divided by _____ number of observations.

3. Mean, median and mode are collectively known as measures of _____.

4. Throwing a die gives _____ possible outcomes.

5. A _____ is the representation of data using bars of uniform width and varying heights.

Down

6. The most common representative value of a group of data is the _____.

7. Tossing a coin gives _____ outcomes.

8. The observation that occurs most often is called the _____.

9. The difference between the highest and lowest observations gives the _____.

10. _____ gives the middle observation of a given data.

11. A _____ bar graph helps in comparing two collections of data at a glance.

12. The number of times each observation occurs can be represented by _____.

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