Unit 3(Data Handling)

Multiple Choice Questions (MCQs)

Question 1:

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

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

Solution:

(b) Here, x, y and z be three observations.

We know that, $\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$

$= \frac{x+y+z}{3}$

Question 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

Solution:

(c) We have, 33, 38, 48, 33, 34, 34, 33 and 24.

On arranging the data in ascending order, we get 24, 33, 33, 33, 34, 34, 38 and 48.

Here, 33 occurs more frequently, i.e. 3 times.

Mode of data = 33

Note Mode is the observation that occurs most frequently in the data.

Question 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

Solution:

(a) Mean Mean is defined as follows:

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

So, if we remove the extrema values that both sum and total number of observations will change. Hence, mean wiii aiso change.

Mode is that observation which occurs the most. So, if extreme value of those values which occurs mostly than mode can affect it they are removed.

Median is the mid value. So, if extreme values are removed than the mid value remains same. Hence, median will not change.

Question 4:

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

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

Solution:

(a) Here,

Highest observation = 21

Lowest observation = 4

Range = Highest observation – Lowest observation

= 21-4 = 17

Question 5:

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

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

Solution:

(c) We know that, median is the middle most observation.

For finding the median of the data firstly, we arrange the data in ascending order, i.e.

Ascending order

i.e 3, 3, 4, 4, 5, 6, 7.

n = 7 (odd)

$$\therefore \text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \text{Value of } \left(\frac{7+1}{2}\right)\text{th observation}$$

$$= 4\text{th observation} = 4$$

Question 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

Solution:

(b) Mode is the most appropriate central tendency because it is the observation that occurs most frequently.

Here, by the measurement of mode, we can find out the chocolates which is most liked by children.

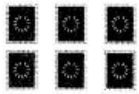
Question 7:

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) 

Solution:

(c) From third set, we are certain to pick the two aces in the first go because it has only 2 cards and it is given that every set has 2 aces.

Question 8:

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

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

Solution:

(b) Probability $= \frac{\text{Number of possible outcomes}}{\text{Total number of outcomes}}$

Total number of cards in set (d) = 6

Number of possible outcomes = 2 [$\because$ 2 aces in every set, given]

So, probability $= \frac{2}{6}$

Question 9:

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

(a) frequency

(b) width

(c) range

(d) mode

Solution:

(c) The difference between the highest and the lowest observations in a data is its range.

Question 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%

Solution:

(b) Total number of outcomes = Total number of students = 5

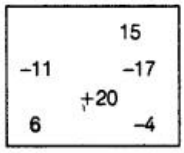
Number of possible outcomes = Students participating in a quiz = 2

$\therefore$ Probability $= \frac{\text{Number of possible outcomes}}{\text{Total number of outcomes}} = \frac{2}{5}$

To find percentage, we have to multiply it by hundred $= \frac{2}{5} \times 100 = 40\%$

Question 11:

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



(a) 31 (b) 37 (c) 20 (d) 3

Solution:

(b) Here, highest observation = + 20 and lowest observation = -17

As we know,

Range = Highest observation – Lowest observation = + 20 – (-17)=20 + 17 = 37

Question 12:

On tossing a coin, the outcome is

(a) only head

(b) only tail

(c) neither head nor tail

(d)either head or tail

Solution:

(d) When we toss a coin, two outcomes are possible, i.e. head or tail.

Question 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

Solution:

(a) Mean of three numbers = 40 and lowest number = 19 [given]

Let the three observations be 19, x and y, respectively.

$$\therefore \quad \text{Mean} = \frac{\text{Sum of all observations}}{\text{Total number of observations}}$$

$$\Rightarrow \quad 40 = \frac{19 + x + y}{3} \qquad [\because \text{mean} = 40, \text{given}]$$

$$\Rightarrow \quad 3 \times 40 = 19 + x + y$$

$$\Rightarrow \quad 120 = 19 + x + y$$

$$\Rightarrow \quad x + y = 120 - 19$$

$$\Rightarrow \quad x + y = 101 \qquad \ldots (i)$$

Since, 19 is the lowest observation.

Hence, for highest possible value of remaining two numbers, one must be 20.

Let $x = 20$

From Eq. (i), we get

$$20 + y = 101$$

$$\Rightarrow \quad y = 101 - 20$$

$$\Rightarrow \quad y = 81$$

Question 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

Solution:

(d) $\text{Average score} = \frac{\text{Sum of scores in all exams}}{\text{Total number of exams}}$

$\therefore$ Average score in first three examinations $= \frac{97 + 73 + 88}{3} = \frac{258}{3} = 86$

Also, average score in four examinations $= \frac{97 + 73 + 88 + 80}{4} = \frac{338}{4} = 84.5$

Hence, average score is decreased by $(86 - 84.5) = 1.5$

Question 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) None of these

Solution:

(c) Mode is the most frequent observation in a data. So, the measure of central tendency best represents the data of most popular politician after a debate.

Question 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

Solution:

(d) We have to find out measure of central tendencies in the four given data.

For option (a)

Data (in ascending order) → 1, 2, 3, 4, 4, 5, 6

Here, $n = 7$ (odd)

Median = Value of $\left(\frac{n+1}{2}\right)$th observation = Value of $\left(\frac{8}{2}\right)$th observation = 4

Mean = $\frac{\text{Sum of observations}}{n} = \frac{1+2+3+4+4+5+6}{7} = \frac{25}{7} = 3.57$

Mode = Most frequent observation = 4

Hence,

Mean ≠ Median = Mode

For option (b)

Data (in ascending order) → 1, 2, 2, 2, 3, 3, 4

Here, $n = 7$ (odd)

Median = Value of $\left(\frac{n+1}{2}\right)$th observation = Value of $\left(\frac{7+1}{2}\right)$th observation = 2

Mean = $\frac{\text{Sum of observations}}{n} = \frac{1+2+2+2+3+3+4}{7} = \frac{17}{7} = 2.428$

Mode = Most frequent observation = 2

Hence,

Mean ≠ Median = Mode

For option (c)

Data (in ascending order) → 2, 2, 3, 3, 3, 7, 8

Here, $n = 7$ (odd)

Median = Value of $\left(\frac{n+1}{2}\right)$th observation = Value of $\left(\frac{7+1}{2}\right)$th observation = 3

Mode = Most frequent data = 3

Mean = $\frac{\text{Sum of observations}}{n} = \frac{2+2+3+3+3+7+8}{7} = \frac{28}{7} = 4$

Hence,

Mean ≠ Median = Mode

For option (d)

Data (in ascending order) → 3, 3, 4, 4, 4, 4, 6

Here, $n = 7$ (odd)

Median = Value of $\left(\frac{n+1}{2}\right)$th observation = Value of $\left(\frac{7+1}{2}\right)$th observation = 4

Mode = Most frequent data = 4

Mean = $\frac{\text{Sum of observations}}{n} = \frac{3+3+4+4+4+4+6}{7} = \frac{28}{7} = 4$

Hence,

Mean = Mode = Median

Fill in the Blanks

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

Question 17:

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

Solution:

The difference between the highest and the lowest observations of a data is called**range.**

Question 18:

The mean of a data is defined as_____.

Solution:

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

Question 19:

In a set of observations, the observation that occurs the most often is called_____.

Solution:

Mode is the most often occurring observation in a set of data.

Question 20:

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

Solution:

Median is the value of middle most observation of a given data, which arranged in ascending or descending order.

Question 21:

Mean, median and mode are the measures of _____.

Solution:

Mean, median and mode are the measures of**central tendency.**

Question 22:

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

Solution:

The probability of an event which is certain to happen is**1**. In other words, probability of a sure event is 1.

Question 23:

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

Solution:

Probability of an impossible event is **0**. As impossible events are those which cannot happen.

Question 24:

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

Solution:

When we throw a die, 6 outcomes are possible, i.e. 1,2, 3, 4, 5, 6.

Total outcomes = 6

Possible outcomes less than 7 = 6 [∵all the outcomes are less than 7]

$$\because \text{Probability} = \frac{\text{Possible outcomes}}{\text{Total outcomes}} = \frac{6}{6} = 1$$

Question 25:

In throwing a die, the number of possible outcomes is_____.

Solution:

When we throw a die, **6** outcomes are possible. They are 1,2, 3, 4, 5 and 6.

Question 26:

_____ can be used to compare two collections of data.

Solution:

A double bar graph can be used to compare two collections of data.

Question 27:

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

Solution:

The representation of data with bars of uniform width is called **bar graph.**

Question 28:

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

Solution:

We know that,

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

$$\Rightarrow \quad 5 = \frac{8+4+x+6+2+7}{6} \qquad [\because \text{mean} = 5, \text{ given}]$$

$$\Rightarrow \quad 30 = 27 + x$$

$$\Rightarrow \quad 30 - 27 = x$$

$$\Rightarrow \quad 3 = x$$

$$\therefore \quad x = 3$$

Hence, the value of x is **3**.

Question 29:

The median of any data lies between the _____ add _____ observations.

Solution:

The median of any data lies between the **minimum** add **maximum** observations.

Question 30:

Median is one of the observations in the data, if number of observations is ____.

Solution:

If number of observations (n) is **odd**, then median is one of the observations in the data.

Note ***Case I*** *If n = odd,*

$$\text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation}$$

Case-II *If n = even,*

$$\text{Median} = \frac{\text{Value of } \left(\frac{n}{2}\right)\text{th observation} + \text{Value of } \left(\frac{n}{2}+1\right)\text{th observation}}{2}$$

Question 31:

Weight (in kg)	44-47	48-51	52-55	56-59
Number of students	3	5	25	7

Solution:

We know that,

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$$

∴ To make the probability highest, we have to take the interval where number of students, i.e. possible outcomes are highest.

Here, probability is highest whose weight is in the interval

True/False

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

Question 32:

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

Solution:

False

As we know, a die has six numbers on it, i.e. 1 to 6. So, it is impossible to get a number greater than 6. Hence, if a die is thrown, the probability of getting a number greater than 6 is 0.

Question 33:

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

Solution:

True

If a coin is tossed, then

Maximum outcomes = 2, i.e. head or tail.

Question 34:

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

Solution:

False

If the extreme observations on both the ends of a data arranged in ascending order are removed, then the mean and mode gets affected but median remains same.

Question 35:

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

Solution:

False

The measures of central tendency lie between the maximum and minimum values of the data.

Question 36:

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

Solution:

True

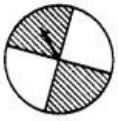
When a die is thrown, maximum possible outcomes are 6, i.e. 1,2, 3,4, 5, 6.

So, when a pair of dice is thrown together, maximum sum will be 12, if and only if both dice get 6 together. So, that pair will be (6, 6) and the sum is 12.

∴ It is impossible to get a sum of 14 on both dice, when a pair of dice is thrown together.

Question 37:

The probability of the spinning arrow stopping in the shaded region in the given figure is ½.



Solution:

True

Favourable outcomes = Number of shaded regions = 2

Total number of possible outcomes = Total number of regions = 4

$$\therefore \text{Probability} = \frac{\text{Favourable outcomes}}{\text{Total number of possible outcomes}} = \frac{2}{4} = \frac{1}{2}$$

Question 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 occurrence of a head is 50 %.

Solution:

False

Number of times in which head occurs = 7

Total number of times, the coin is tossed = 15

$\therefore$ Probability of getting a head = $\frac{7}{15}$

Question 39:

Mean, median and mode may be the same for some data.

Solution:

True

Mean, median and mode can be the same for some data

See Q. No. 16.

Question 40:

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

Solution:

False

Probability of an event can never be greater than 1. It always remains from 0 and 1 for any event.

$$0 \le P(E) \le 1$$

$\therefore$ Maximum probability can be 1.

Question 41:

Mode of the data is always from the given data.

Solution:

False

It is not compulsory that mean of the data is always from the given data. It may or may not be the observation from given data.

Question 42:

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

Solution:

True

e.g.

(i) 2, 4, 6, 8, 10

Here, $n = 5$ (odd)

$$\text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \text{Value of } \left(\frac{5+1}{2}\right)\text{th observation}$$

$$= \text{Value of 3rd observation} = 6$$

(ii) 4, 6, 8, 8, 12, 14, 15, 16

Here, $n = 8$ (even)

$$\text{Median} = \frac{\text{Value of } \left(\frac{n}{2}\right)\text{th observation} + \text{Value of } \left(\frac{n}{2}+1\right)\text{th observation}}{2}$$

$$= \frac{\text{Value of 4th observation} + \text{Value of 5th observation}}{2} = \frac{8+12}{2} = \frac{20}{2} = 10$$

Question 43:

Mode of the data is always from the given data.

Solution:

True

Mode of the data is always from the given data as it is the most frequent observation in the data.

Question 44:

Mean of the observations can be lesser than each of the observations.

Solution:

False

Mean is the average value of all the observations. Some of the observations are less than it and some of observations are more than it.

Question 45:

Mean can never be a fraction.

Solution:

False

$$\text{e.g. Mean between } \frac{1}{4} \text{ and } \frac{1}{6} = \frac{\text{Sum of } \frac{1}{4} \text{ and } \frac{1}{6}}{n} = \frac{\frac{1}{4}+\frac{1}{6}}{2} \quad [\because n \text{ (number of terms)} = 2]$$

$$= \frac{\frac{6+4}{24}}{2} = \frac{10}{24} \times \frac{1}{2} = \frac{5}{24}$$

Question 46:

Range of the data is always from the data.

Solution:

False

It is not necessary as range is the difference of highest observation and lowest observation.

Question 47:

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

Solution:

True

Given data is 12, 13,14,15,16.

Here, each observation has same frequency, so every observation is a mode.

Question 48:

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

Solution:

False

Range before subtraction by 2 = Highest observation – Lowest observation

= 7-(-5) = 7+ 5 = 12

Data after subtract by 2

= 2 -2,-5-2, 4-2, 3-2,7 -2, 6-2, i.e. 0,-7, 2, 1,5, 4

Range = Highest observation – Lowest observation = 5 – (-7) = 5+7 = 12

So, the range is same.

Question 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.

Solution:

False

Because, range before adding 8 = Maximum observation – Minimum observation

= 7-(-5) = 7+ 5 = 12

Data after adding 8

= 3 + 8,7 + 8,1 + 8, -2 + 8,2 + 8, 6+ 8, – 3 + 8, -5 + 8, i.e. 11,15, 9, 6, 10,14, 5, 3

So, the range is same. Range = Maximum observation – Minimum observation = 15-3 = 12

Question 50:

Calculate the mean, median and mode of the following data:

5, 10, 10, 12, 13

Are these three equal?

Solution:

Given data is 5,10,10,12,13.

Sum of all observations = 5+10+10+12 +13 = 50

Number of observations = 5

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Total observations}} = \frac{50}{5} = 10$$

Here, $n = 5$ (odd)

So, median = value of $\left(\frac{n+1}{2}\right)$ th observation

$$= \text{value of } \left(\frac{5+1}{2}\right) \text{th observation} = \text{value of 3 rd observation} = 10$$

Mode = Most frequent data = 10

Hence,

Mean = Median = Mode

Yes,

Mean, median and mode are equal.

Question 51:

Find the mean of the first ten even natural numbers.

Solution:

First ten even natural numbers = 2, 4, 6, 8,10,12,14,16,18, 20.

Sum of all observations = 2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20= 110

Number of observations = 10

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

$$\therefore \quad \text{Mean} = \frac{110}{10} = 11$$

Question 52:

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

Solution:

Since, mode is the observation that occurs most frequently in a set of observation.

Question 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)?

Solution:

(a) Red colour of the car liked by people = 15

Black colour of the car liked by people = 20

White colour of the car liked by people = 17

Silver colour of the car liked by people = 12

Other colour of the car liked by people = 9

Hence, black colour of the car is the most liked.

(b) Mode concept used in (a).

Question 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

Solution:

Given data is 31,37, 35, 38, 42, 23,17,18, 35, 25, 35, 29.

Rearranging the given data in ascending order,

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

(a) Range = Highest observation – Lowest observation = 42 – 17 = 25

(b) $$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Total number of observations}}$$

$$= \frac{17 + 18 + 23 + 25 + 29 + 31 + 35 + 35 + 35 + 37 + 38 + 42}{12}$$

$$= \frac{365}{12} = 30.41$$

(c) Here, $n = 12$ (even)

$$\text{Median} = \frac{\text{Value of } \left(\frac{n}{2}\right)\text{th observation} + \text{Value of } \left(\frac{n}{2}+1\right)\text{th observation}}{2}$$

$$= \frac{\text{Value of 6th observation} + \text{Value of 7th observation}}{2}$$

$$= \frac{31 + 35}{2} = \frac{66}{2} = 33$$

(d) Mode = Most frequent observation = 35

Question 55:

The following are weights (in kg) of 12 persons:

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 weight above the mean weight?

(c) Find the range of the given data.

Solution:

(a) The weights of 12 persons are 70, 62, 54, 57, 62, 84, 75, 59, 62, 65, 78 and 60.

Sum of weights of 12 people

= 70+ 62 + 54+ 57 + 62+ 84+ 75+ 59 + 62 + 65 + 78 + 60 = 788

Number of observations (persons) = 12

$$\therefore \text{Mean} = \frac{\text{Sum of all observations (weight of 12 persons)}}{\text{Number of observations}} = \frac{788}{12} = 65.66$$

(b) Weights above 65.66 are 70, 84, 75 and 78, i.e. 4 persons.

(c) Range = Maximum observation – Minimum observation = 84 – 54 = 30

Question 56:

Following cards are put facing down

A	E	I	O	U

What is the change of drawing out

(a) a vowel?

(b) a card marked LR

(c) A or I?

(d) a consonant?

Solution:

(a) We can clearly see that all the 5 letters are vowels, i.e. A, E, I, O, Hence, it is certain to draw a vowel, i.e. probability of drawing a vowel is 1.

$$\text{(b) Probability} = \frac{\text{Number of cards marked } U}{\text{Total number of cards}} = \frac{1}{5}$$

$$\text{(c) Probability} = \frac{\text{Number of cards marked } A \text{ or } I}{\text{Total number of cards}} = \frac{2}{5}$$

$$\text{(d) Probability} = \frac{\text{Number of cards marked with a consonant}}{\text{Total number of cards}} = \frac{0}{5} = 0$$

Hence, it is impossible to draw a consonant.

Question 57:

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

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

Solution:

Given, data in ascending order is 2, 2, 3, 3, 4, 4, 4, 5, 6

Hence, $n = 9$ (odd)

$$\text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \left(\frac{9+1}{2}\right)\text{th observation} = 5\text{th observation} = 4$$

Mode = Most frequent observation = 4

Mean is the central value.

$$\therefore \quad \text{Mean} = \frac{1}{2}[3 \times \text{Median} - \text{Mode}]$$

$$= \frac{1}{2}[3 \times 4 - 4] = \frac{1}{2}[12 - 4]$$

$$= \frac{1}{2} \times 8 = 4$$

Question 58:

Find the median of the given data, if the mean is

4.5. 5, 7, 7, 8, x, 5, 4, 3, 1, 2

Solution:

Given, mean = 4.5

$$\text{We know that,} \quad \text{Mean} = \frac{\text{Sum of all observations}}{\text{Total number of observations}}$$

$$\Rightarrow \quad 4.5 = \frac{5+7+7+8+x+5+4+3+1+2}{10}$$

$$\Rightarrow \quad 4.5 \times 10 = 42 + x \Rightarrow 45 - 42 = x$$

$$\therefore \quad x = 3$$

Now, arrange the data in ascending order

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

Here, $n = 10$ (even)

$$\text{Median} = \frac{\text{Value of } \left(\frac{n}{2}\right)\text{th observation} + \text{Value of } \left(\frac{n}{2}+1\right)\text{th observation}}{2}$$

$$= \frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2} = \frac{4+5}{2} = \frac{9}{2} = 4.5$$

Question 59:

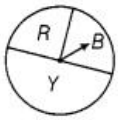
What is the probability of the sun setting tomorrow?

Solution:

Setting of the sun is a sure event. Hence, its probability is 1.

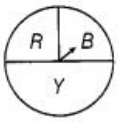
Question 60:

When a spinner with three colours given in figure is rotated, which colour has more chance to show up with arrow than the others?



Solution:

From the figure, area covered by the yellow colour is maximum out of the given three colours. Hence, chances of yellow colour to show up with arrow will be more.



Question 61:

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

Solution:

Given, total children = 7 = 4 boys and 3 girls.

So, favourable outcomes for a day = 4

Total number of possible outcomes = 7

$$\therefore \text{Probability} = \frac{\text{Favourable outcomes}}{\text{Total number of possible outcomes}} = \frac{4}{7}$$

Question 62:

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

Solution:

In the word ' MEDIAN', there is only one D.

So, favourable outcomes = number of letter D = 1

Total number of possible outcomes = 6

$$\therefore \text{Probability} = \frac{\text{Favourable outcomes}}{\text{Total number of possible outomes}} = \frac{1}{6}$$

Question 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 sometime.

Solution:

(a) Getting a number less than **1** on throwing a die is impossible, as a die does not have a number less than 1 on it.

(b) Getting head, when a coin is tossed may or may not happen as a coin has head and tail on its two faces. So, we might get a head or a tail on tossing it.

(c) A team may or may not win a match.

(d) Christmas is certain to happen on 25th

(e) It is impossible that moon will not revolve around the earth.

(f) It is certain to happen that a ball thrown up in the air will fall down after sometime due to gravity.

Question 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.

Solution:

Given data is 5, 3, 4,1,2, 6, 4, 2, 2, 3,1,5, 6,1,2

Arranging the data in ascending order, we have

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

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

$$= \frac{1+1+1+2+2+2+2+3+3+4+4+5+5+6+6}{15} = \frac{47}{15} = 3.13$$

Mode = Most frequent data = 2

Here, $n = 15$ (odd)

$$\text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \text{Value of } \left(\frac{15+1}{2}\right)\text{th observation}$$

= Value of 8th observation = 3

Question 65:

Find the mean of first six multiples of 4.

Solution:

First six multiples of 4 are 4, 8, 12, 16, 20, 24.

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

$$= \frac{4+8+12+16+20+24}{6} = \frac{84}{6}$$

$$= 14$$

Hence, the mean of first six multiples of 4 is 14.

Question 66:

Find the median of first nine even natural numbers.

Solution:

First nine even natural numbers are

2,4,6,8,10,12,14,16,18.

Here, $n = 9$ (odd)

$$\therefore \text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \text{Value of } \left(\frac{9+1}{2}\right)\text{th observation}$$

= Value of 5th observation = 10

Hence, the median of first nine even natural numbers is 10.

Question 67:

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

Solution:

$$\text{Mean of three numbers} = \frac{\text{Sum of three numbers}}{3}$$

$$\Rightarrow \quad 10 = \frac{\text{Sum of three numbers}}{3} \quad [\because \text{mean of three numbers} = 10, \text{given}]$$

Hence, sum of three numbers = 30

$$\text{Mean of other four numbers} = \frac{\text{Sum of other four numbers}}{4}$$

$$\Rightarrow \quad 12 = \frac{\text{Sum of other four numbers}}{4} \quad [\because \text{mean of other four numbers} = 12, \text{given}]$$

Hence, sum of other four numbers = 48

$$\therefore \text{Mean of all the numbers} = \frac{\text{Sum of all the numbers}}{\text{Total numbers}}$$

$$= \frac{[\text{Sum of first three numbers} + \text{Sum of other four numbers}]}{7}$$

$$= \frac{30+48}{7} = \frac{78}{7} = 11.14$$

Hence, mean of all the numbers is 11.14.

Question 68:

Find the mode of the given data.

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

Solution:

We know that, mode is the most frequent observation in the data.

∴ Mode = 8

Question 69:

Given below are heights of 15 boys of a class measured in centimetres:

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

Solution:

Given, height (data) of 15 boys of a class are

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

Arranging the given data in ascending order, we have

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

(a) By observing the data, height of the tallest boy = 154 cm

(b) By observing the data, height of the shortest boy = 128 cm

(c) Here, highest observation = 154 and lowest observation = 128

∴ Range = Highest observation – Lowest observation = 154-128 = 26cm

(d) Here, $n = 15$ (odd)

$$\therefore \text{Median} = \text{Value of } \left(\frac{n+1}{2}\right)\text{th observation} = \text{Value of } \left(\frac{15+1}{2}\right)\text{th observation}$$

$$= \text{Value of } 8\text{th observation}$$

$$= 142 \text{ cm}$$

Question 70:

Observe the data and answer the questions that follow:

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

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

Atleast how many and which value(s) must be put into change the mode to 15?

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

Name them.

Solution:

Given data; 16,15,16,16,8,15,17

Arranging the given data in ascending order, we have 8, 15, 15, 16, 16, 16, 17

(a) As per the given data, 16 is the mode of data, since it has highest frequency, i.e. 3.

Now, if 15 is added to the given data, mode will get changed to 15 and 16, whereas if any other number, i.e. 8,16 or 17 is added, mode will remain same.

(b) Atleast two 15's should be added to change the mode to 15. On adding two 15's the frequency of 15 will be maximum, i.e. 4.

(c) We will have to add atleast three 17's to change the mode to 17. On adding three 17's, the frequency of 17 will be maximum, i.e. 4.

Question 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.

Solution:

From the given table, age of children in group A = 7 yr, 7 yr, 9 yr, 8 yr, 10 yr, 10 yr

Age of children in group 8 = 7 yr, 9 yr, 11 yr, 12 yr, 12 yr, 12 yr

(a) Mode in group A = 7 yr and 10 yr. [∵ 7 yr and 10 yr occurs most frequent, i.e.2times]

Range in group A = Maximum value – Minimum value = 10-7 = 3

Mode in groups = 12 yr [∵ 12yr is the most frequent, i.e. 3]

Range in group 8 = Maximum value – Minimum value = 12 – 7 = 5

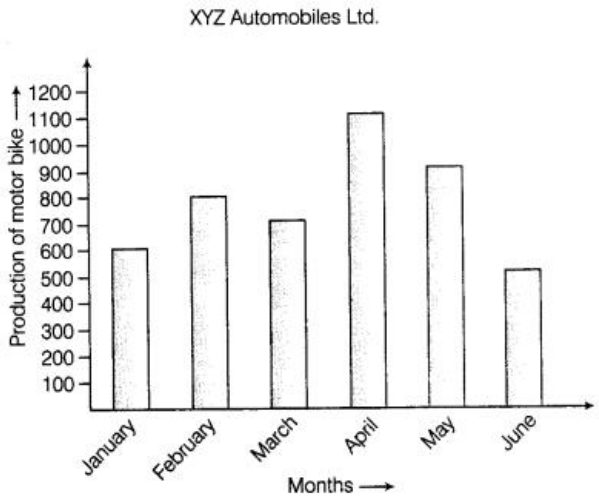
(b) If both groups are combined together 7, 7, 7, 9, 9,11,8,12,10,12,10,12.

Mode = 7 and 12 [∵ 7 and 12 occurs most frequent, i.e. 3 times]

∴ Range = Maximum value – Minimum value = 12-7 = 5

Question 72:

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



(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).

Solution:

(a) The given bar graph shows the production of motor bikes by XYZ automobiles Ltd. during January to June.

(b) Total number of motor bikes produced in first three months = Motor bikes produced in January + Motor bikes produced in February + Motor bikes produced in March

= 600 + 800 + 700

= 2100

(c) Increase in production in May over the production in January

= Production in May – Production in January = 900 – 600= 300

(d) By observing the graph, we can say that the production was minimum in the month of June, i.e. 500.

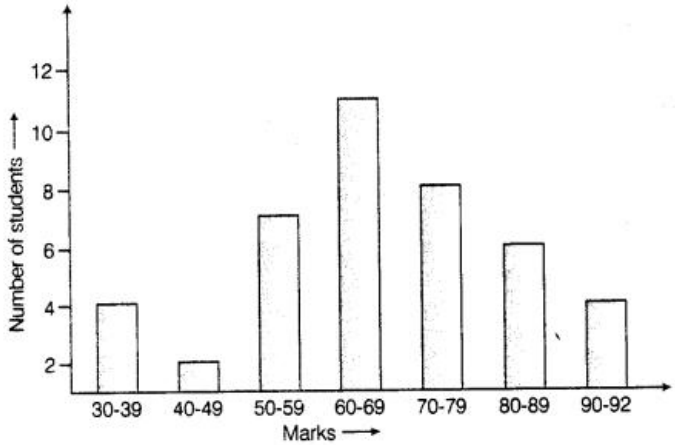
(e) Average production $= \frac{\text{Total production}}{\text{Number of months}}$

$= \frac{600 + 800 + 700 + 1100 + 900 + 500}{6}$

$= \frac{4600}{6} = 767$ bikes (approx.)

Question 73:

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



Study the bar graph and answer the following questions:

(a) If 40 is the pass marks, 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 three?

(e)What is the strength of the class?

Solution:

(a) If 40 is the pass marks, then students who got marks less than 40 will be failed.

$\therefore$ Number of students who failed = 4

(b) Number of students who got marks from 50 to 69

= Number of students who got marks from 50 to 59
+ Number of students who got marks from 60 to 69

= 7 + 11 = 18

(c) Number of students scored 90 marks and above

= Number of students who scored marks 90 to 92

= 4

(d) Number of students who scored marks above 80

= Number of students who score 80 to 89
+ Number of students who score 90 to 92

= 6 + 4 = 10

Since, students who scored marks above 80 are given merits.

$\therefore$ Number of students who are merit holders = 10

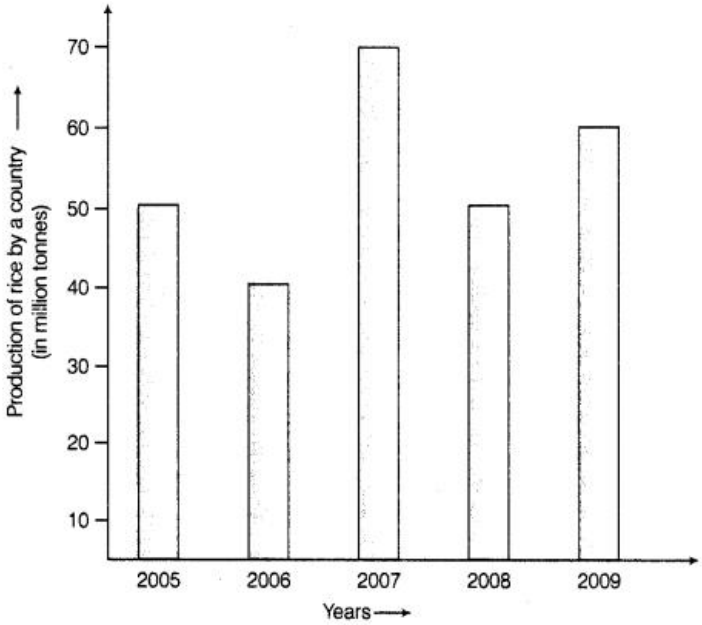
(e) Strength of the class = Total number of students who scored different marks

= 4 + 2 + 7 + 11 + 8 + 6 + 4

= 42

Question 74:

Study the graph given below and answer the questions that follow:



(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.

Solution:

After studying the bar graph, we have

Production of rice in 2005 = 50 million tonne

Production of rice in 2006 = 40 million tonne

Production of rice in 2007 = 70 million tonne

Production of rice in 2008 = 50 million tonne

Production of rice in 2009 = 60 million tonne

(a) The bar graph shows the production of rice in million tonne by a country during years 2005 to 2009.

(b) The production of rice was the least in 2006, i.e. 40 million tonne.

(c) The maximum production of rice was in 2007. The production rose after 2006.

(d) For average production,

$$\text{Sum of productions} = 50 + 40 + 70 + 50 + 60 = 270$$

$$\text{Average production} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

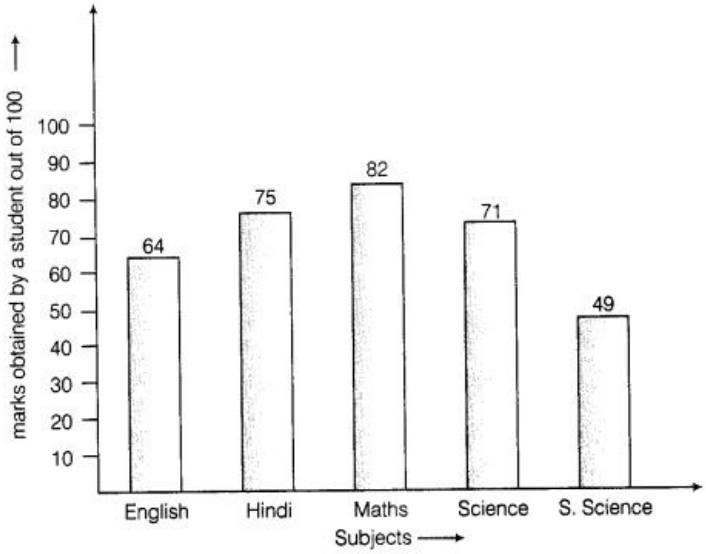
$$\text{Average production} = \frac{270}{5} = 54 \text{ million tonne}$$

(e) Production in 2006 = 40 million tonne and production in 2008 = 50 million tonne

Difference = 50 – 40 = 10 million tonne.

Question 75:

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



(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.

Solution:

(a) he given bar graph shows marks obtained by a student in different subjects out of 100.

(b) Subject in which student is very good, Maths as he scored highest marks, i.e. 82

(c) $\text{Average marks} = \frac{\text{Sum of all marks obtained in various subjects}}{\text{Total subjects}}$

$= \frac{64 + 75 + 82 + 71 + 49}{5}$

$= \frac{341}{5}$

$= 68.2\%$

(d) In Hindi and Maths, student got 75 and 82 marks, respectively. Since, the marks equal to 75 or above denote a distinction. Hence, student got distinction in Hindi and Maths.

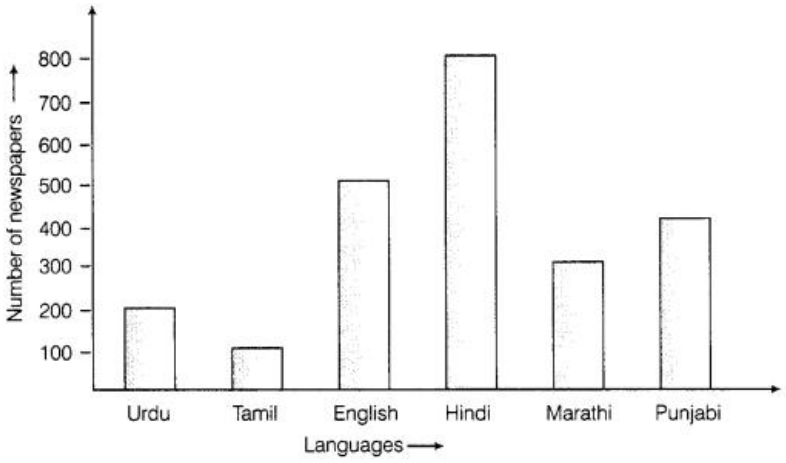
(e) $\text{Percentage marks} = \frac{\text{Total marks scored}}{\text{Total marks}} \times 100\%$

$= \frac{341}{500} \times 100\%$

$= 68.2\%$

Question 76:

The bar graph given below represents the circulation of newspapers (dailies) in a town in six languages (the figures are approximated to hundreds).



Study the bar graph and answer the following questions:

(a) Find the total number of newspapers read in Hindi, Punjabi, Urdu, Marathi and Tamil.

(b) Find the excess number of newspapers read in Hindi than those in English.

(c) Name the language in which the least number of newspapers are read.

(d) Write the total circulation of newspaper in the town.

Solution:

Number of newspapers in Urdu = 200

Number of newspapers in Tamil = 100

Number of newspapers in English = 500

Number of newspapers in Hindi = 800

Number of newspapers in Marathi = 300

Number of newspapers in Punjabi = 400

(a) Total number of newspapers read in Hindi, Punjabi, Urdu, Marathi and Tamil

= 800 + 400 + 200 + 300 + 100

= 1800

(b) Excess number of newspapers read in Hindi than those in English

= Number of newspapers read in Hindi – Number of newspapers read in English

= 800 – 500 = 300

(c) Out of all the newspapers, least number of newspapers in Tamil, i.e. 100 newspapers are read.

(d) Total circulation of newspapers in the town

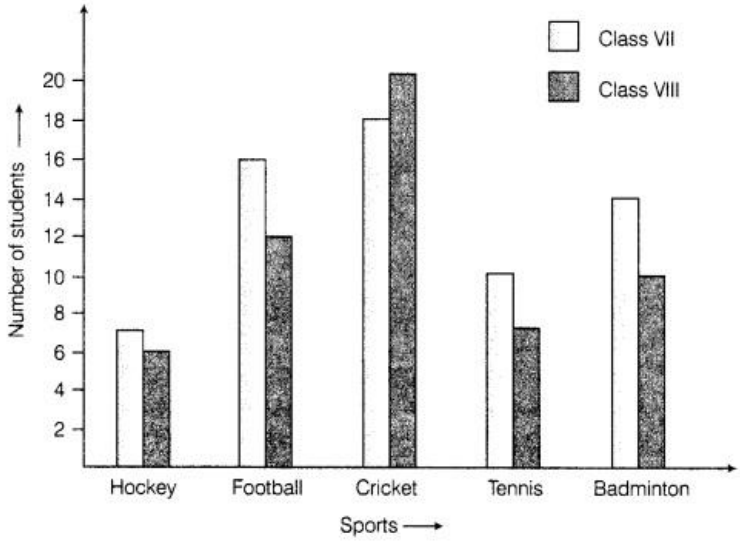
= Number of newspapers in six different languages

= 200 + 100 + 500 + 800 + 300 + 400

= 2300

Question 77:

Study the double bar graphs given below and answer the following questions:



(a) Which sport is liked the most by class VIII students?

(b) How many students of class VII like Hockey and Tennis in all?

(c) How many students are there in class VII?

(d) For which sport is the number of students of class VII less than that of class VIII?

(e) For how many sports students of class VIII are less than class VII?

(f) Find the ratio of students who like Badminton in class VII to students who like Tennis in class VIII.

Solution:

(a) By observing the graph, we can say that the height of the bar corresponding to cricket for class VIII student is largest. Hence, cricket is liked the most by class VIII students.

(b) Height of bar corresponding to hockey and tennis for class VII are 7 and 10 respectively.

So, total students of class VII who like hockey and tennis = 7 + 10 =17

(c) Total number of students in class VII = Sum of heights of all the bars for class VII

= 7 + 16+18+10+14=65

(d) The sport for which number of students of class VII is less than that of class VIII will be

that for which height of bar is less.

By observing the graph in case of cricket height of bar is less for class VII as compared to class VIII.

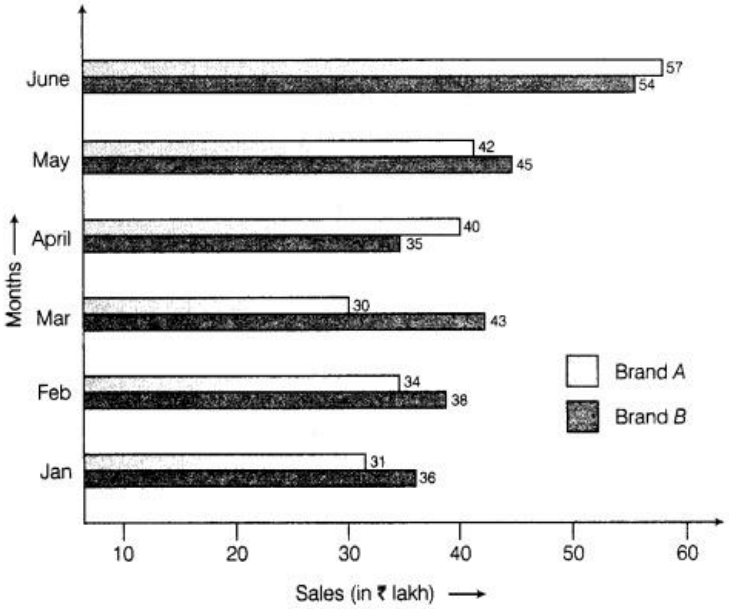
(e) We can clearly see from the double bar graph for Hockey, Football, Tennis and Badminton, the number of students are less for class VIII as compared to class VII.

(f) Number of students who like badminton in class VII = 14 and number of students who like tennis in class VIII = 7

∴ Required ratio = 14:7 = 2:1

Question 78:

Study the double bar graph shown below and answer the questions that follow:



(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

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

Solution:

(a) The above double bar graph compares the sale of brands A and 6 during the months of January to June.

(b) We can clearly see from the double bar graph that sales for brand A reduced in the month of March compared to that of February.

(c) Sales of brand A in June = 157 lakh and sales of brand 6 in June = Rs. 54 lakh

Difference in sales = 57 – 54 = Rs. 3 lakh

(d) Average sales of brand *B*

$$= \frac{\text{Total sales of brand } B \text{ in six months from January to June}}{6}$$

$$= \frac{36 + 38 + 43 + 35 + 45 + 54}{6} = \frac{251}{6} = ₹\ 41.83 \text{ lakh}$$

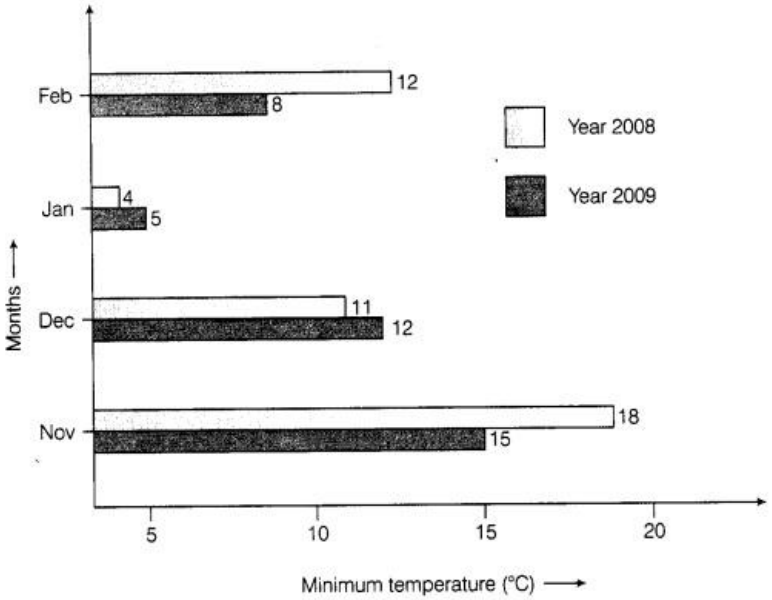
(e) We can clearly see from the double bar graph that sales of brand S is less than sales of brand A in the month of April and June.

(f) Sales of brand A in January = 31 and sales of brand S in January = 36 \

∴Required ratio = 31/36 or 31: 366

Question 79:

Study the double bar graph shown given below and answer the question that follow:



(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?

Solution:

(a) The above double bar graph compares the minimum temperature during the month November to February for the years 2008 and 2009.

(b) Minimum temperature of November in year 2008 = 18°C

Minimum temperature of November in year 2009 = 15°C

∴ Required ratio = 18/ 15 = 18:15 = 6:5

(c) We can clearly see from the double bar graph that the minimum temperature in the year 2008 greater than that of the year 2009 for the month of February and November.

(d) Average minimum temperature for year 2008

$$= \frac{\text{Total temperature for year 2008 in four months}}{4}$$

$$= \frac{18 + 11 + 4 + 12}{4}$$

$$= \frac{45}{4}$$

$$= 11.25$$

(e) Difference of temperature for different months can be shown by following table:

Month	Difference of temperature
November	18 – 15 = 3
December	12 – 11 = 1
January	5 – 4 = 1
February	12 – 8 = 4

From the above table, it is clear that for the month of February variation in two temperatures is maximum.

Question 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

Solution:

Steps to construct the bar graphs are as follows:

Step I Firstly, we draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

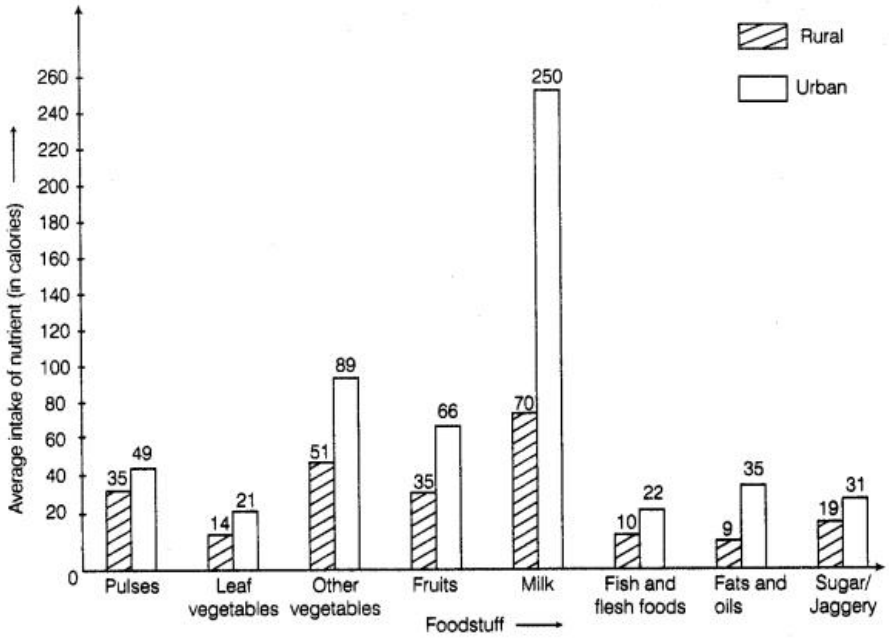
Step II Along the horizontal axis, we mark the foodstuff and along the vertical axis, we mark the intake of nutrients (calories).

Step III We choose a suitable scale to determine the heights of bars. Here, we choose the scale as 1 small division to represent

20.

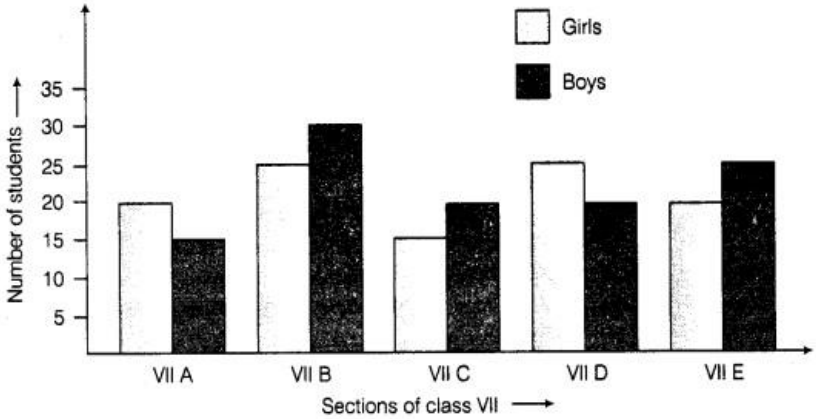
Step IV First, we draw the bars for rural and then bars of urban for different foodstuff.

Bars for rural and urban are shaded separately and the shading is shown at the top right corner of the graph paper.



Question 81:

Study the double bar graph and answer the questions that follow:



(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, number of girls is greater than 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?

Solution:

(a) The above graphs shows the number of students (boys and girls) in different sections of class VII.

(b) It is clear from the graph, total number of boys in all sections of class VII = Sum of heights of all the bars corresponding to boys in different sections = 15+ 30 + 20 + 20 + 25=110

(c) It is clear from the graph that in sections VII A and VII D, the number of girls are greater than the number of boys.

(d)From the graph, it is clear that in section VII B, number of boys is maximum.

(e) From the graph, it is clear that in section VII C, number of girls is minimum,

Question 82:

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

Days	Mon	Tue	Wed	Thur	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 a appropriate scale.

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

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

Solution :

Steps to construct the bar graphs are as follows:

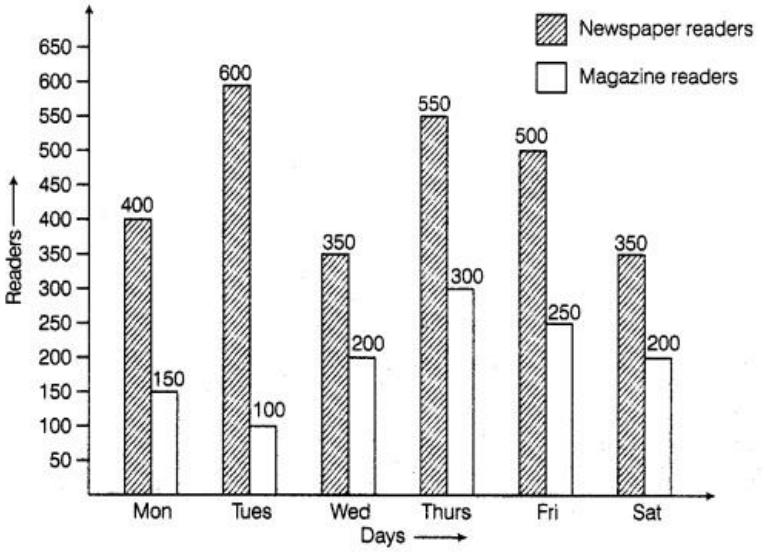
Step I We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

Step II Along the horizontal axis, we mark the days and along the vertical axis, we mark the readers.

Step III We choose a suitable scale to determine the heights of bars.Here, we choose the scale as 1 small division to represent 50.

Step IV First, we draw the bars for newspaper readers and then bars for magazine readers for different days.

Bars for newspapers and magazine readers are shaded separately and the shading is shown in the top right corner of the graph paper.



(b) Total number of both readers on different days are

Day	Readers
Mon	400 + 150 = 550
Tue	600 + 100 = 700
Wed	350 + 200 = 550
Thur	550 + 300 = 850
Fri	500 + 250 = 750
Sat	350 + 200 = 550

Hence, it is clear that the number of readers was maximum on Thursday.

(c) Mean of readers $= \frac{\text{Sum of all the magazine readers on six days}}{6}$

$= \frac{150 + 100 + 200 + 300 + 250 + 200}{6}$

$= \frac{1200}{6} = 200$

Question 83:

Observe the following data:

Government School, Chandpur

Daily attendance — Date: 15. 04. 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?

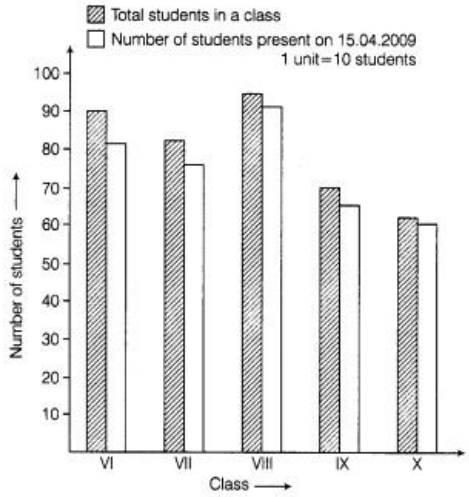
(c) In which class, the difference of total students and number of students present is minimum?

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

(e) What percentage of class VI students were absent?

Solution:

(a) A double bar graph is shown below:



We infer from the bar graph that maximum number of students were absent in class VI on 15.04.2009, whereas minimum number of students were absent in class X.

(b) Clearly, class VIII has maximum number of students, i.e. 95.

(c) The difference of total number of students and number of students present is minimum for class X i.e. 63 – 62 = 1

(d) Number of students present in class IX = 65

Total number of students in class IX = 70

Hence, required ratio = $\frac{65}{70} = \frac{13}{14}$ or 13 : 14

(e) Total number of students in class VI = 90

Number of students present in class VI = 81

Number of absent students = 90 – 81 = 9

$\therefore$ Percentage of absent students of class VI = $\left(\frac{\text{Number of absent students}}{\text{Total number of students}} \times 100\right)\%$

$= \left(\frac{9}{90} \times 100\right)\% = 10\%$

Question 84:

Observe the following 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?

Solution:

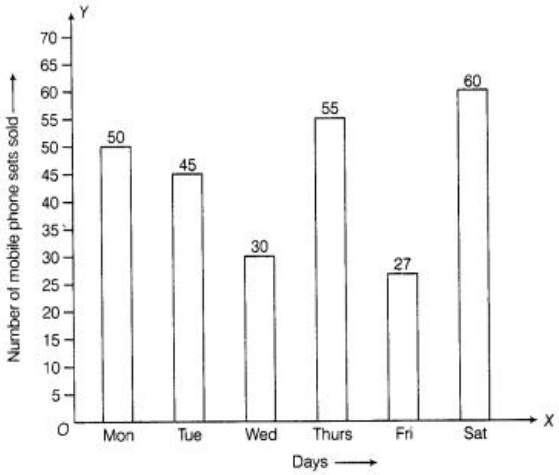
(a) In order to construct a bar graph representing the above data, we follow the following steps:

Step I Take a graph paper and draw two mutually perpendicular lines OX and OY. Call OX as the horizontal axis and OY as the vertical axis.

Step II Along OX, mark days and along OY, mark number of mobile phone sets sold.

Step III Along OX, choose the uniform (equal) width of the bars and the uniform gap between them, according to the space available for the graph,

Step IV Choose a suitable scale to determine the heights of the bars, according to the availability of space. Here, we choose 1 small division to represent 5 mobile sets.



(b) It is clear from graph that on Saturday the sales was maximum.

(c) Total sale during the week = Sum of all the sales on each day

$= 50 + 45 + 30 + 55 + 27 + 60 = 267$

(d) Minimum sale on Friday = 27

Maximum sale on Saturday = 60

$\therefore$ Required ratio = 27 : 60 = 9 : 20

(e) Average sale $= \frac{\text{Total sale}}{6}$

$= \frac{267}{6}$

$= 44.5$

(f) On Monday, Tuesday, Thursday and Saturday, i.e. 4 days the sale was above the average sale.

Question 85:

Below is a list of 10 tallest buildings in India.

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

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

Name	City	Height	Floors	Year
Planet	Mumbai	181 m	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 skyscrapers?

(d) What is the range of data?

(e) Find the median of the data.

(f)Draw a bar graph for given data.

Solution:

(a) Clearly, Imperial I, Imperial II and Ashok Towers are three tallest buildings.

Building	Height	Number of storeys	Height of each storey
Imperial I	249 m	60	249 / 60 = 4.15
Imperial II	249 m	60	249 / 60 = 4.15
Ashok Towers	193 m	49	193 / 49 = 3.94

(b) Average height of each storey of the buildings given in (a)

$$= \frac{\text{[Sum of heights of each storey of three tallest buildings]}}{3} = \frac{4.15 + 4.15 + 3.94}{3}$$

$$= \frac{12.24}{3} = 4.08$$

(c) We can clearly see from the data, Mumbai has maximum number of skyscrapers from the list given. It has 9 skyscrapers out of the list of 10 buildings given.

$\therefore$ Required percentage $= \frac{9}{10} \times 100 = 90\%$

(d) Range of data = Maximum height – Minimum height = 249 – 156 = 93

(e) Arranging the data in ascending order, we get 156, 170, 170, 170, 180, 181, 184, 193, 249, 249. Since, there are ten observations, median will be the mean of 5th and 6th observations.

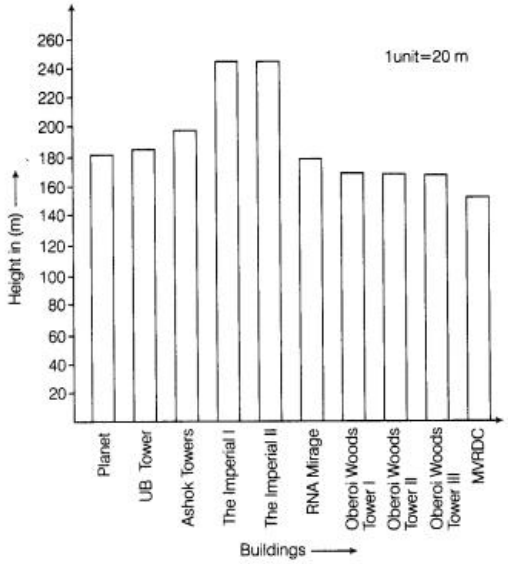
$n = 10$ (even)

$$\therefore \text{Median} = \frac{\frac{n}{2}\text{th observation} + \left(\frac{n}{2}+1\right)\text{th observation}}{2}$$

$$= \frac{\left(\frac{10}{2}\right)\text{th observation} + \left(\frac{10}{2}+1\right)\text{th observation}}{2} = \frac{5\text{th observation} + 6\text{th observation}}{2}$$

$$= \frac{180 + 181}{2} = 180.5$$

(f) A bar graph is as shown below:



Question 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?

Solution:

(a) Steps to construct the bar graphs are as follows :

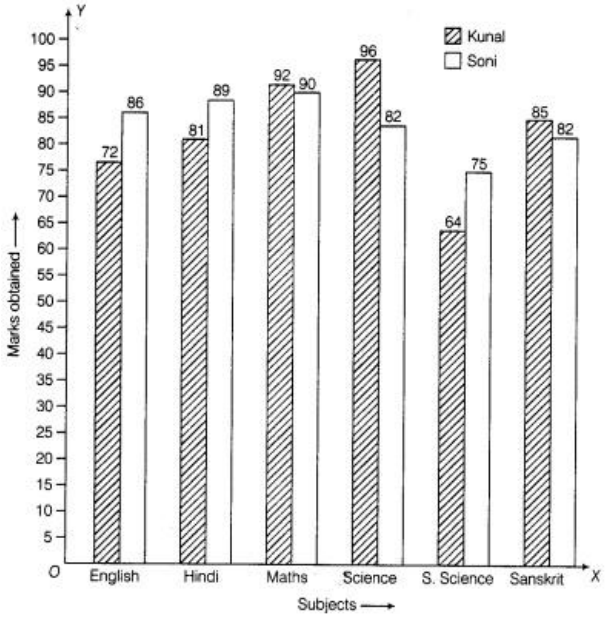
Step I We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

Step II Along the horizontal axis, OX mark the subjects and along vertical axis, OY mark the marks obtained.

Step III We choose a suitable scale to determine the heights of bars. Here, we choose the scale as 1 small division to represent 5 marks.

Step IV First, we draw the bars for Kunal and then bars for Soni for different years.

Bars for Kunal and Soni shaded separately and the shading is shown in the top right corner of the graph paper.



(b) Total percentage of marks obtained by Soni

$$= \left(\frac{\text{Total marks obtained by Soni in six subjects}}{600} \times 100\right)\%$$

$$= \left(\frac{86 + 89 + 90 + 82 + 75 + 82}{600} \times 100\right)\% = \left(\frac{504}{600} \times 100\right)\% = 84\%$$

(c) Total percentage of marks obtained by Kunal

$$= \left(\frac{\text{Total marks obtained by Kunal in six subjects}}{600} \times 100\right)\%$$

$$= \left(\frac{72 + 81 + 92 + 96 + 64 + 85}{600} \times 100\right)\% = \left(\frac{490}{600} \times 100\right)\% = 81.6\%$$

(d) Ratio of percentage marks obtained by Kunal and Soni = 81.6 : 84 = 34 : 35

(e) In English, Hindi and S.Science, Soni get more marks than Kunal.

(f) Marks obtained by Kunal and Soni is S. Science are 64 and 75, respectively. Therefore, Soni got more marks than Kunal by 11 marks.

(g) In English and Science, the difference of marks was maximum = (504 – 490), i.e.14 marks.

Question 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 dub the difference between boys and girls is the least

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

Solution:

(a) Steps to construct the bar graph are as follows :

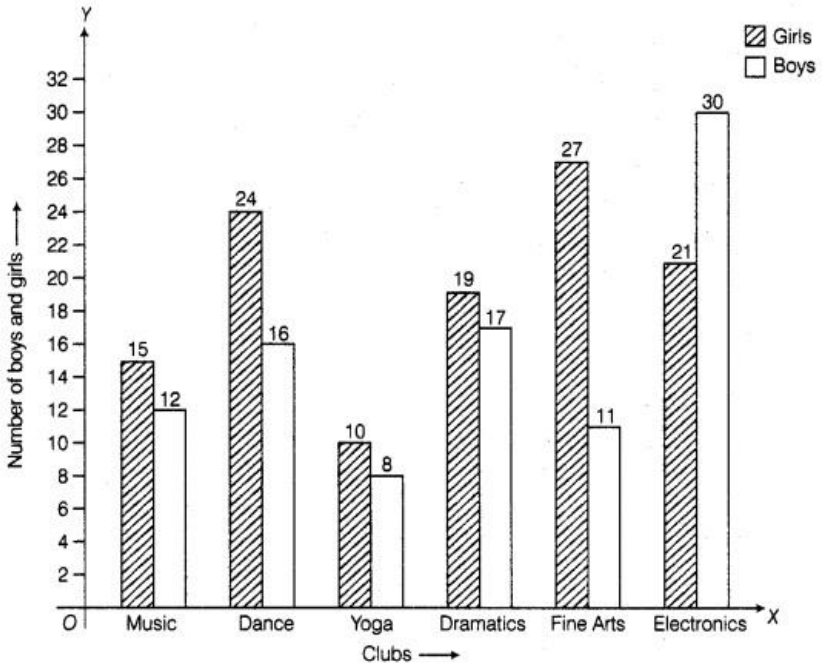
Step I We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

Step II Along the horizontal axis, OX mark the clubs and along the vertical axis, OY mark the number of boys and girls.

Step III We choose a suitable scale to determine the heights of bars.

Here, we choose the scale as 1 small division to represent 2.

Step IV First, we draw the bars for girls and then bars for boys for different years. Bars for girls and boys are shaded separately and the shading is shown in the top right corner of the graph paper



(b) Total students in class VII

= 15+ 12 + 24 + 16+ 10+ 8+ 19 + 17 + 27 + 11 + 21+ 30 =210

(c) From the given data, we can say that most preferred club by boys is Electronics.

(d) From the given data, we can say that least preferred club by girls is Yoga.

(e) It is clear from the given data in Yoga and Dramatics, the difference between boys and girls is the least, i.e. (19 -17) = 2

(f) It is clear from the given data in Fine Arts the difference between boys and girls is maximum, i.e. (27 -11) = 16

Question 88:

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

Months	Feb	May	Aug	Oct	Dec
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?

Solution:

(a) Steps to construct the bar graphs are as follows:

Step I We draw two lines perpendicular to each other on a graph paper and call them

horizontal and vertical axes.

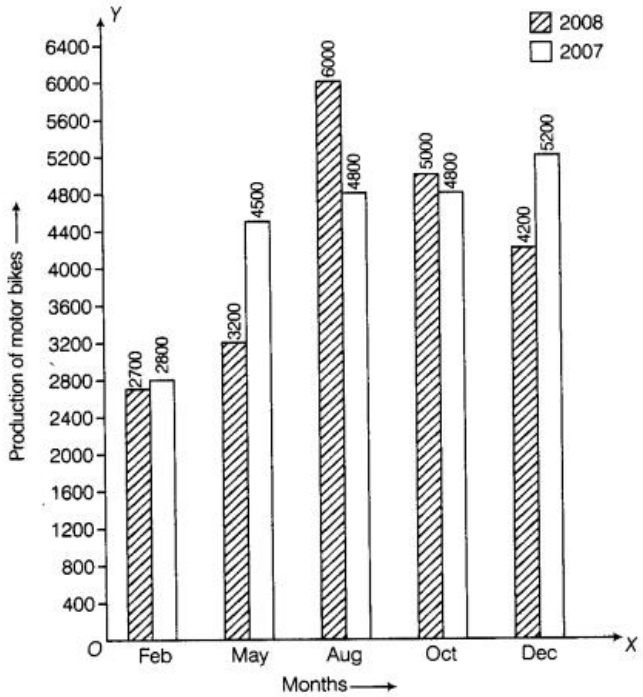
Step II Along the horizontal axis, OX mark the months and along the vertical axis, OY mark the production of motor bikes.

Step III We choose a suitable scale to determine the heights of bars.

Here, we choose the scale as 1 big division to represent 400.

Step IV First, we draw the bars for Year 2008 and then bars for Year 2007 for different months.

Bars for year 2008 and year 2007 months are shaded separately and the shading is shown in the top right corner of the graph paper.



(b) Total output in year 2008 $= 2700 + 3200 + 6000 + 5000 + 4200 = 21100$

Total output in year 2007 $= 2800 + 4500 + 4800 + 4800 + 5200 = 22100$

$\therefore$ Total output in year 2007 is more than year 2008.

(c) Mean production for the year 2007 $= \frac{\text{Total production in year 2007 for 5 months}}{5}$

$= \frac{22100}{5} = 4420$

(d) It is clear from the given data in May the difference between the production for the two years in maximum, i.e. 1300.

(e) In August the production was maximum, i.e. 6000 as compared to other months of year 2008.

(f) In February the production was minimum, i.e. 2800 as compared to other months of year 2007.

Question 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?

Solution:

(a) Steps to construct the bar graph are as follows :

Step I We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

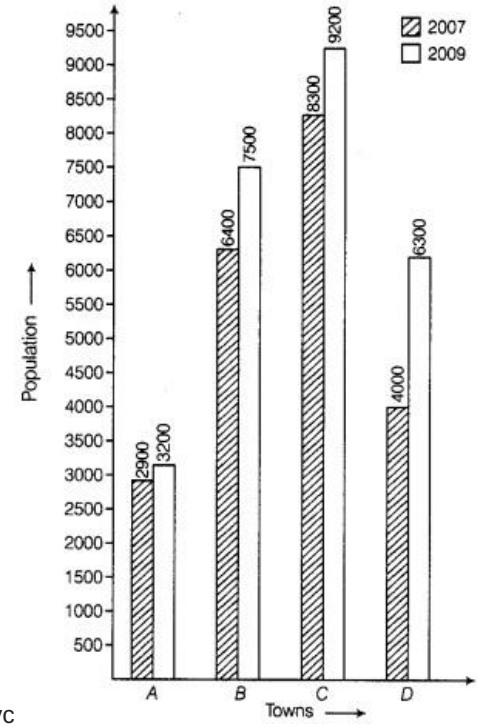
Step II Along the horizontal axis, OX mark the towns and along the vertical axis, OY mark the population.

Step III We choose a suitable scale to determine the heights of bars. Here, we choose the scale as 1 small division to represent

500,

Step IV First, we draw the bars for year 2007 and then bars for year 2009 for different towns.

Bars for year 2007 and 2009 are shaded separately and the shading is shown in the top right corner of the graph paper.



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(b) It is clear from the graph, the population growth of town D was maximum.

(c) It is clear from the graph, the population growth of town A was minimum.

Question 90:

The table below gives the data of tourists visiting 5 hill stations over two consecutive years. Study the table and answer 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 least number of tourists in 2009?

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

Solution:

(a) Steps to construct the bar graph as follows:

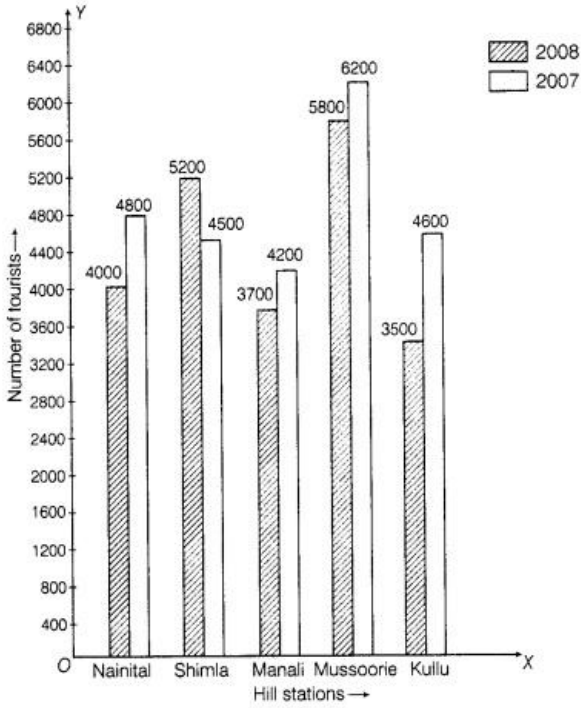
Step I We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes.

Step II Along the horizontal axis, OX mark the hill stations and along the vertical axis, OY mark the tourist visitors.

Step III We choose a suitable scale to determine the heights of bars. Here, we choose the scale as 1 small division to represent 400 tourists.

Step IV First, we draw the bars for year 2008 and then bars for year 2009 for different hill stations.

Bars for years 2008 and 2009 are shaded separately and the shading is shown in the top right corner of the graph paper,



(b) It is clear from the given data that in year 2008 tourists visit Mussoorie the most maximum.

(c)It is clear from the given data that in year 2009 tourists visit Manali the least.

(d) From the graph, we can say that in 2009, there is increase in tourist visitors in the places; Manali, Nainital, Mussoorie and Kullu.

Question 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?

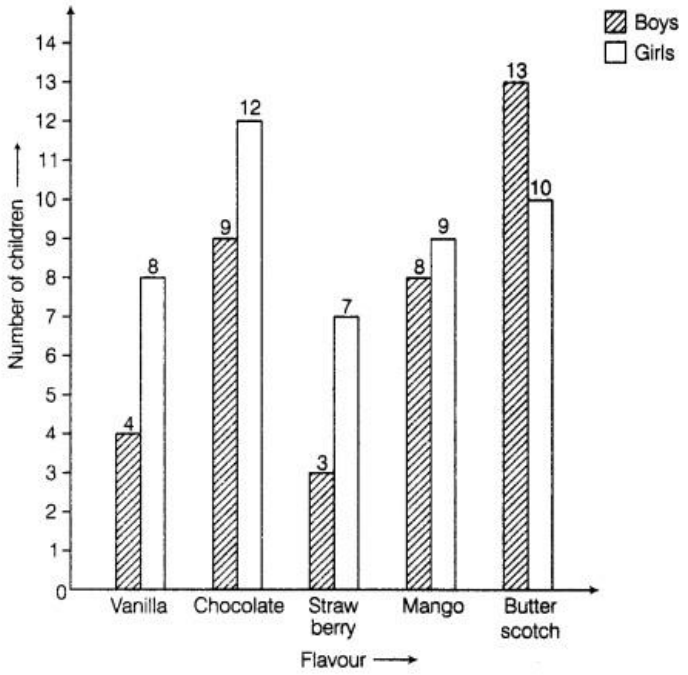
(c) How many girls are there in all?

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

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

Solution:

(a) Bar graph of the given data is:



(b) On observing the bar graph, we can say that boys like butterscotch the most because the bar for butterscotch in case of boys is of highest length, i.e. 13.

(c) Total number of girls = Sum of heights of bars corresponding to girls

= 8+12 + 7 + 9+10=46

(d)Number of children who like chocolate flavour = Sum of heights of bars for both boys and girls corresponding to chocolate

= 9 + 12 = 21

(e) Total number of children who like strawberry =3+7=10

Total number of children who like vanilla =4+8=12

∴ Ratio of children who like strawberry flavour to vanilla flavour of ice-cream

= 10:12 = 5:6