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9,184,321	492,461,127	3,986,828	8,017,171
HAPPY STUDENTS	QUESTIONS ATTEMPTED	TESTS TAKEN	DOUBTS ANSWERED

NCERT Solutions for Class 9 Subjectwise

- Class 9 Maths
- Class 9 Science
- Class 9 Science – Chemistry
- Class 9 Science – Biology
- Class 9 Science – Physics
- Class 9 Social Science – History
- Class 9 Social Science – Geography
- Class 9 Social Science – Civics
- Class 9 Social Science – Economics
- Class 9 English

#463408

Topic: Pictograph, Bar graph, Pie graph and Line graph

The shoppers who come to a departmental store are marked as: man (M), woman (W), boy (B) or girl (G). The following list gives the shoppers who came during the first hour in the morning:
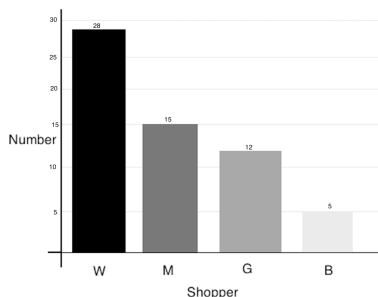
W W W G B W W M G G M M W W W W G B M W B G G M W W M M W W

W M W B W G M W W W W G W M M W W M W G W M G W M M B G G W

Make a frequency distribution table using tally marks. Draw a bar graph to illustrate it.

Solution

Shopper	Tally marks	Number
W	ЖЖ ЖЖ ЖЖ ЖЖ ЖЖ III	28
M	ЖЖ ЖЖ ЖЖ	15
G	ЖЖ ЖЖ II	12
B	ЖЖ	5

#463409

Topic: Frequency Distribution

The weekly wages (in Rs) of 30 workers in a factory are:

$830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833$

$855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890$

$806, 840$

Using tally marks make a frequency table with intervals as

$800 - 810, 810 - 820$ and so on

Solution

Interval	Tally marks	Frequancy
800 - 810	III	3
810 - 820	II	2
820 - 830	I	1
830 - 840	ЖЖ IIII	9
840 - 850	ЖЖ	5
850 - 860	I	1
860 - 870	III	3
870 - 880	I	1
880 - 890	I	1

#463410

Topic: Histogram

Draw a histogram for the frequency table made for the data in Question 3, and answer the following questions.

(i) Which group has the maximum number of workers?

(ii) How many workers earn Rs 850 and more?

(iii) How many workers earn less than Rs 850?

Solution

(i) $830 - 840$: Maximum number of workers.

(ii) Workers earn more than $Rs850$:

It will be workers who fall in the group of $850 - 860, 860 - 870, 870 - 880, 880 - 890$

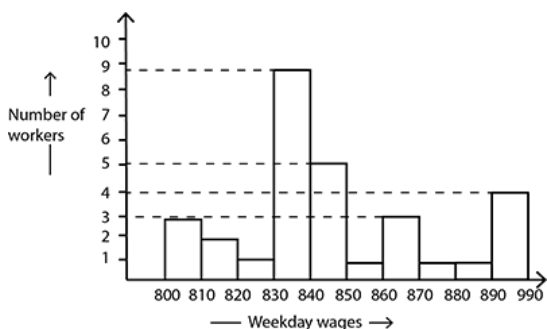$\therefore$ Sum of number of all workers $= 1 + 3 + 1 + 1 + 4$

$= 10$

(iii) The worker who earn less than $Rs850$:

Category will be: $800 - 810, 810 - 820, 820 - 830, 830 - 840$ and $840 - 850$
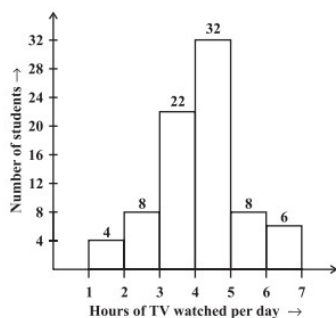
$\therefore$ Sum of numbers of these workers $= 3 + 2 + 1 + 9 + 5$

$= 20$

#463413
Topic: Histogram

The number of hours for which students of a particular class watched television during holidays is shown through the given graph.

Answer the following.

(i) For how many hours did the maximum number of students watch TV?

(ii) How many students watched TV for less than 4 hours?

(iii) How many students spent more than 5 hours in watching TV?

Solution

(i) Maximum number of students : 32

Watched TV for $(4 - 5)$ hours

(ii) Students who watched TV for less than 4 hours belong to category : $1 - 2 hrs, 2 - 3 hrs$ or $3 - 4 hrs$.

Total number of student: $4 + 8 + 22$

$= 34$

(iii) The students who watched TV for more than 5 hours: Category - $5 - 6$ or $6 - 7$ hours

$\therefore$ Total number of students: $8 + 6 = 14$

#464308
Topic: Data

Give five examples of data that you can collect from your day-to-day life.

Solution

Examples :

(1) Number of trains that passes through Thane railway station.

(2) Number of Barbie dolls available in different Barbie stores in Mumbai.

(3) Number of foodies visit the zomato website.

(4) Number of people visit in a museum during summer.

(5) Number of musicians in Mumbai city who knows both guitar and drum.

#464309

Topic: Data

Classify the following data as primary or secondary data.

(1) Number of trains that passes through Thane railway station.

(2) Number of Barbie dolls available in different Barbie stores in Mumbai.

(3) Number of foodies visit the zomato website.

(4) Number of people visit in a museum during summer.

(5) Number of musicians in Mumbai city who knows both guitar and drum.

Solution

Primary data: If the investigation has definite object while collecting the information, then data is called as primary data.

Therefore, (3), (4), (5) are examples of primary data.

Secondary data: If information is gathered from source which already had information, then data is called secondary data.

Therefore, (1), (2) are examples of secondary data.

#464313

Topic: Frequency Distribution

The blood groups of 30 students of Class VIII are recorded as follows:

$A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O,$

$A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O$

Represent this data in the form of a frequency distribution table. Which is the most common, and which is the rarest, blood group among these students?

Solution

Blood group	Number of students
A	9
B	6
O	12
AB	3
Total	30

Most common - O (12 students)

Rarest - AB (3 students)

#464316

Topic: Frequency Distribution

The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	12

Construct a grouped frequency distribution table with class size 5 for the data given above taking the first interval as $0 - 5$ (5 not included). What main features do you observe from this tabular representation?

Solution

Mostly engineers who travel from residence to work place travel around $20\ km$.

Distances (in km)	Tally Marks	Frequency
0 - 5	ⅣⅣ	5
5 - 10	ⅣⅣ ⅣⅣ Ⅰ	11
10 - 15	ⅣⅣ ⅣⅣ Ⅰ	11
15 - 20	ⅣⅣ ⅠⅠⅠⅠ	9
20 - 25	Ⅰ	1
25 - 30	Ⅰ	1
30 - 35	ⅠⅠ	2
Total		40

#464318
Topic: Frequency Distribution

The relative humidity (in %) of a certain city for a month of 30 days was as follows:

98.1	98.6	99.2	90.3	86.5	95.3	92.9	96.3	94.2	95.1
89.2	92.3	97.1	93.5	92.7	95.1	97.2	93.3	95.2	97.3
96.2	92.1	84.9	90.2	95.7	98.3	97.3	96.1	92.1	89

(i) Construct a grouped frequency distribution table with classes $84 - 86, 86 - 88$ etc.

(ii) Which month or season do you think this data is about?

(iii) What is the range of this data?

Solution

Relative Humidity (in $\%$)	Frequency
$84 - 86$	1
$86 - 88$	1
$88 - 90$	2
$90 - 92$	2
$92 - 94$	7
$94 - 96$	6
$96 - 98$	7
$98 - 100$	4
Total	30

(i) The figure above is the frequency distribution.

(ii) The data appears to be taken in the rainy season as the relative humidity is high.

(iii) Range of data = Maximum value - Minimum value $= 99.2 - 84.9 = 14.3$

#464320
Topic: Frequency Distribution

The heights of 50 students, measured to the nearest centimetres, have been found to be as follows:

161	150	154	165	168	161	154	162	150	151
162	164	171	165	158	154	156	172	160	170
153	159	161	170	162	165	166	168	165	164
154	152	153	156	158	162	160	161	173	166
161	159	162	167	168	159	158	153	154	159

(i) Represent the data given above by a grouped frequency distribution table, taking the class intervals as $160 - 165, 165 - 170$,etc.

(ii) What can you conclude about their heights from the table?

Solution

Height (in cm)	Frequency
$150 - 155$	12
$155 - 160$	9
$160 - 165$	14
$165 - 170$	10
$170 - 175$	5
Total	50

(i) The above table is the grouped frequency distribution.

(ii) Students with $160 - 165 cm$ heights are maximum i.e. 14 students.

#464327
Topic: Frequency Distribution

A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows:

0.03	0.08	0.08	0.09	0.04	0.17
0.16	0.05	0.02	0.06	0.18	0.20
0.11	0.08	0.12	0.13	0.22	0.07
0.08	0.01	0.10	0.06	0.09	0.18
0.11	0.07	0.05	0.07	0.01	0.04

(i) Make a grouped frequency distribution table for this data with class intervals as $0.00 - 0.04, 0.04 - 0.08$ and so on.

(ii) For how many days, was the concentration of sulphur dioxide more than 0.11 parts per million?

Solution

Concentration of sulphur dioxide (in ppm)	Frequency
0.00 - 0.04	4
0.04 - 0.08	9
0.08 - 0.12	9
0.12 - 0.16	2
0.16 - 0.20	4
0.20 - 0.24	2
Total	30

(i) The figure above is the grouped frequency distribution.

(ii) The number of days for which concentration of SO_2 is more than $0.11 \rightarrow 0.12 - 0.16, 0.16 - 0.20, 0.20 - 0.24$

$\therefore$ Total number of days $= 2 + 4 + 2 = 8$days.

#464329
Topic: Frequency Distribution

Three coins were tossed 30 times simultaneously. Each time the number of heads occurring was noted down as follows:

0	1	2	2	1	2	3	1	3	0
1	3	1	1	2	2	0	1	2	1
3	0	0	1	1	2	3	2	2	0

Prepare a frequency distribution table for the data given above.

Solution

Number of heads	Frequency
0	6
1	10
2	9
3	5
Total	30

#464330

Topic: Frequency Distribution

The value of π upto 50 decimal places is given below:

3.14159265358979323846264338327950288419716939937510

(i) Make a frequency distribution of the digits from 0 to 9 after the decimal point.

(ii) What are the most and the least frequently occurring digits?

Solution

(i)

Digits	Frequency
0	2
1	5
2	5
3	8
4	4
5	5
6	4
7	4
8	5
9	8
Total	50

(ii) Least frequency $\rightarrow 0 \rightarrow 2$ times

Maximum frequency $\rightarrow 3$ & $9 \rightarrow 8$ times

#464339

Topic: Frequency Distribution

Thirty children were asked about the number of hours they watched TV programmes in the previous week. The results were found as follows:

1   6   2   3   5   12   5   8   4   8
10   3   4   12   2   8   15   1   17   6
3   2   8   5   9   6   8   7   14   12

(i) Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals as $5 - 10$.

(ii) How many children watched television for 15 or more hours a week?

Solution

Number of hours	Frequency
0-5	10
5-10	13
10-15	5
15-20	2
Total	30

(i) Above table

(ii) Number of children who watched TV for 15 hours or more $= 2$ children.

#464341

Topic: Frequency Distribution

A company manufactures car batteries of a particular type. The lives (in years) of 40 such batteries were recorded as follows:

2.6   3.0   3.7   3.2   2.2   4.1   3.5   4.5
3.5   2.3   3.2   3.4   3.8   3.2   4.6   3.7
2.5   4.4   3.4   3.3   2.9   3.0   4.3   2.8
3.5   3.2   3.9   3.2   3.2   3.1   3.7   3.4
4.6   3.8   3.2   2.6   3.5   4.2   2.9   3.6

Construct a grouped frequency distribution table for this data, using class intervals of size 0.5 starting from the interval $2 - 2.5$.

Solution

Life of batteries (in years)	Frequency
2.0 - 2.5	2
2.5 - 3.0	6
3.0 - 3.5	14
3.5 - 4.0	11
4.0 - 4.5	4
4.5 - 5.0	3
Total	40

Class size : 0.5

#464412

Topic: Pictograph, Bar graph, Pie graph and Line graph

S.No.	Causes	Female fatality rate (%)
1.	Reproductive health conditions	31.8
2.	Neuropsychiatric conditions	25.4
3.	Injuries	12.4
4.	Cardiovascular conditions	4.3
5.	Respiratory conditions	4.1
6.	Other causes	22.0

A survey conducted by an organisation for the cause of illness and death among the women between the ages $15 - 44$ (in years) worldwide, found the following figures (in %):

(i) Represent the information given above graphically.

(ii) Which condition is the major cause of women's ill health and death worldwide?

(iii) Try to find out, with the help of your teacher, any two factors which play a major role in the cause in (ii) above being the major cause.
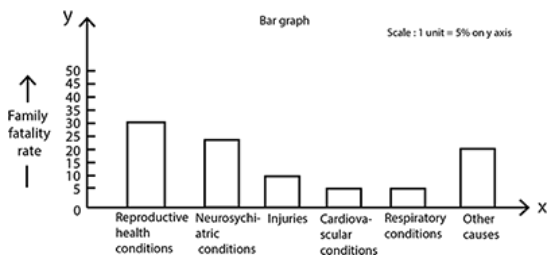
Solution

(i) Bar graph

(ii) Major cause of women's ill health : Reproductive health conditions : 31.8%

(iii) Factors are:

(i) Medical infrastructure in work.

(ii) Lack of treatment facilitators and facilities.

#464414

Topic: Pictograph, Bar graph, Pie graph and Line graph

Section	Number of girls per thousand boys
Scheduled Caste (SC)	940
Scheduled Tribe (ST)	970
Non SC/ST	920
Backward districts	950
Non-backward districts	920
Rural	930
Urban	910

The following data on the number of girls (to the nearest ten) per thousand boys in different sections of Indian society is given below.
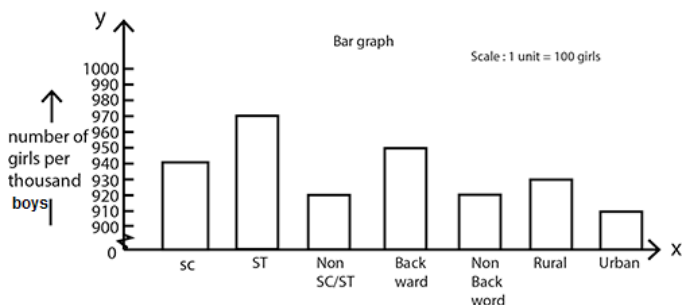
(i) Represent the information above by a bar graph.

(ii) In the classroom discuss what conclusions can be arrived at from the graph.

Solution

ST : Maximum girls : 970

Urban : Minimum girls : 910

Number of girls in rural $>$ urban.

#464415

Topic: Pictograph, Bar graph, Pie graph and Line graph

Political Party	A	B	C	D	E	F
Seats Won	75	55	37	29	10	37

Given below are the seats won by different political parties in the polling outcome of a state assembly elections:
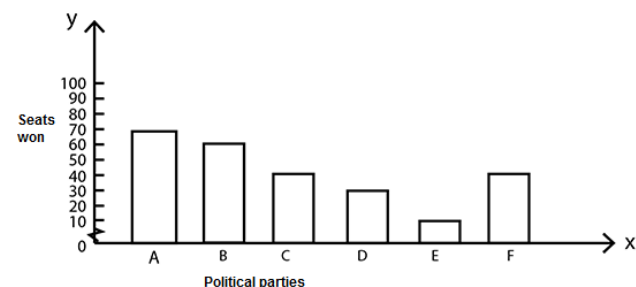
(i) Draw a bar graph to represent the polling results.

(ii) Which political party won the maximum number of seats?

Solution

(i) Bar graph

ii) Party A.

#464416

Topic: Histogram

Length (in mm)	Number of leaves
118 - 126	3
127 - 135	5
136 - 144	9
145 - 153	12
154 - 162	5
163 - 171	4
172 - 180	2

The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

(i) Draw a histogram to represent the given data. [Hint: First make the class intervals continuous]

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves are $153mm$ long? Why?

Solution

Length (in mm)	New length (in mm)	No. of leaves
118 - 126	117.5 - 126.5	3
127 - 135	126.5 - 135.5	5
136 - 144	135.5 - 144.5	9
145 - 153	144.5 - 153.5	12
154 - 162	153.5 - 162.5	5
163 - 171	162.5 - 171.5	4
172 - 180	171.5 - 180.5	2

In order to make a histogram, we need to convert discontinuous classes to continuous classes.
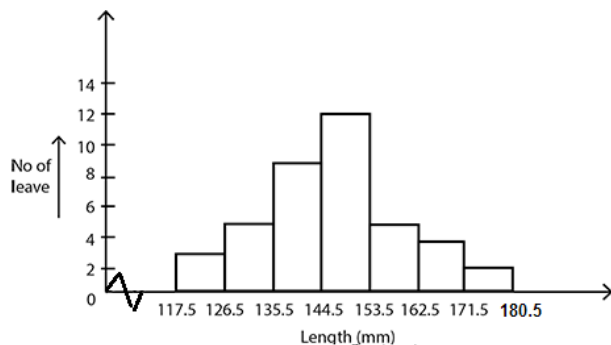
$\text{Adjustment} = \dfrac{1}{2}(\text{lower limit of class - upper limit of previous class})$

$= \dfrac{1}{2}(127 - 126) = 0.5$

So, 0.5 needs to be subtracted from upper limit of previous class and lower limit of next class.

(ii) Frequency polygon

(iii) No. It is a range. The maximum number of leaves lies in between $144.5mm - 154.5mm$. Not necessary that it all occurs as $153mm$ length.

#464417

Topic: Frequency Distribution

Life time (in hours)	Number of lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

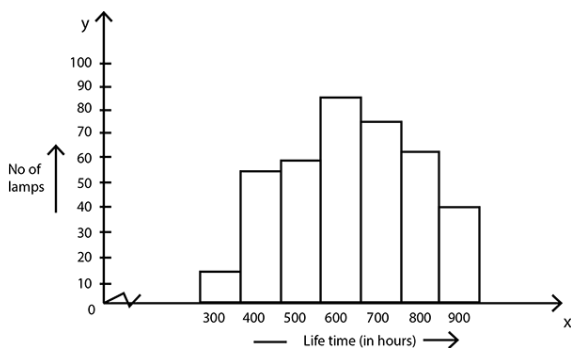The following table gives the life times of 400 neon lamps:

(i) Represent the given information with the help of a histogram.

(ii) How many lamps have a life time of more than 700 hours?

Solution

(ii) Lifetime of more than 700 hours : $700 - 800, 800 - 900$ & $900 - 1000$

$\therefore$ Number of neon lamps $= 74 + 62 + 48 = 184$

#464419

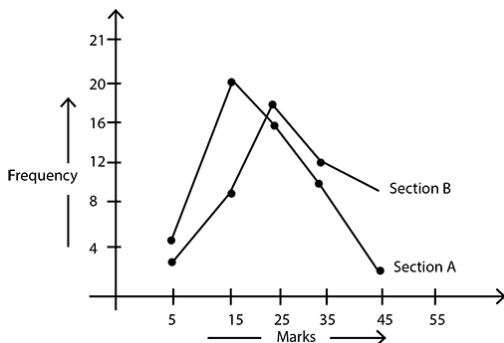**Topic:** Frequency Polygon and Frequency Curve

Section A		Section B	
Marks	Frequency	Marks	Frequency
0 - 10	3	0 - 10	5
10 - 20	9	10 - 20	19
20 - 30	17	20 - 30	15
30 - 40	12	30 - 40	10
40 - 50	9	40 - 50	1

The following table gives the distribution of students of two sections according to the marks obtained by them:

Represent the marks of the students of both the sections on the same graph of two frequency polygons. From the two polygons compare the performance of the two sections.

Solution

Marks obtained by section A is better than section B.

#464421

Topic: Frequency Polygon and Frequency Curve

Number of balls	Team A	Team B
1 - 6	2	5
7 - 12	1	6
13 - 18	8	2
19 - 24	9	10
25 - 30	4	5
31 - 36	5	6
37 - 42	6	3
43 - 48	10	4
49 - 54	6	8
55 - 60	2	10

The runs scored by two teams A and B on the first 60 balls in a cricket match are given below:

Represent the data of both the teams on the same graph by frequency polygons.

Solution

No. of balls	Class mark	Team A	Team B
0.5 - 6.5	3.5	2	5
6.5 - 12.5	9.5	1	6
12.5 - 18.5	15.5	8	2
18.5 - 24.5	21.5	9	10
24.5 - 30.5	27.5	4	5
30.5 - 36.5	33.5	5	6
36.5 - 42.5	39.5	6	3
42.5 - 48.5	45.5	10	4
48.5 - 54.5	51.5	6	8
54.5 - 60.5	57.5	2	10

Class intervals are not continuous.

$\therefore$ Because of gap of 1, 0.5 has to added and subtracted from upper and lower class limits.

$$\text{Class mark} = \frac{upper\ class\ limit + lower\ class\ limit}{2}$$
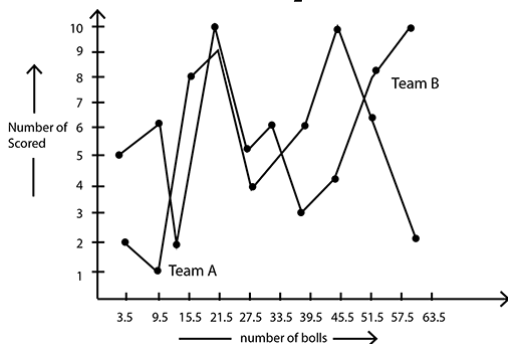
#464422

Topic: Histogram

| Age (in years)	Number of children
1 - 2	5
2 - 3	3
3 - 5	6
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	4

A random survey of the number of children of various age group playing in a park was found as follows:

Draw a histogram to represent the data above.

Solution

Age (in years)	Frequency	Width	Length of the rectangle
1 - 2	5	1	$\frac{5}{1} \times 1 = 5$
2 - 3	3	1	$\frac{3}{1} \times 1 = 3$
3 - 5	6	2	$\frac{6}{2} \times 1 = 3$
5 - 7	12	2	$\frac{12}{2} \times 1 = 6$
7 - 10	9	3	$\frac{9}{3} \times 1 = 3$
10 - 15	10	5	$\frac{10}{5} \times 1 = 2$
15 - 17	4	2	$\frac{4}{2} \times 1 = 2$

Width is not constant. So, we have to first calculate the length of rectangle to draw histogram according to the width as shown in the above figure.
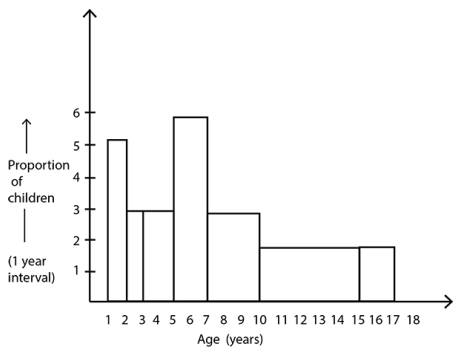
#464425

Topic: Histogram

| Number of letters	Number of surnames
1 - 4	6
4 - 6	30
6 - 8	44
8 - 12	16
12 - 20	4

100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows:

(i) Draw a histogram to depict the given information.

(ii) Write the class interval in which the maximum number of surnames lie.

Solution

No. of letters	Frequency	Width of interval	Length of rectangle
1 - 4	6	3	$\frac{6}{3} \times 2 = 4$
4 - 6	30	2	$\frac{30}{2} \times 2 = 30$
6 - 8	44	2	$\frac{44}{2} \times 2 = 44$
8 - 12	16	4	$\frac{16}{4} \times 2 = 8$
12 - 20	4	8	$\frac{4}{8} \times 2 = 1$

(ii) $44 \rightarrow 6 - 8$ interval
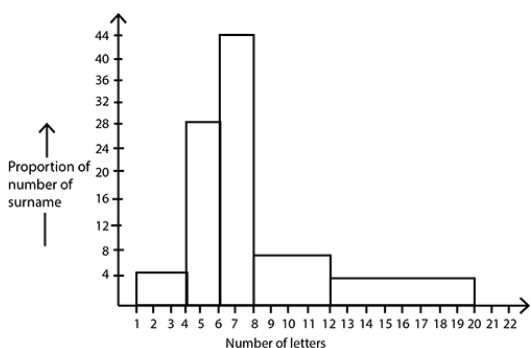
#464426

Topic: Median

The following number of goals were scored by a team in a series of 10 matches:

$2, 3, 4, 5, 0, 1, 3, 3, 4, 3$

Find the mean, median and mode of these scores.

Solution

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

$$= \frac{2+3+4+5+0+1+3+3+4+3}{10}$$

$$= \frac{28}{10} = 2.8;$$

Total observations $= 10$ (even)

$$\therefore \text{Median} = \frac{10}{2} = 5\text{th \&} \ \frac{10}{2} + 1 = 6\text{th}$$

$$\text{Median score} = \frac{5^{th} + 6^{th} \ \text{observations}}{2} = \frac{3+3}{2} = \frac{6}{2} = 3$$

Maximum frequency $= 4$ of 3;

$$\therefore \text{Mode} = 3$$

#464428
Topic: Median

In a mathematics test given to 15 students, the following marks (out of 100) are recorded:

$41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60$

Find the mean, median and mode of this data.

Solution

The marks of 15 students is

$41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60$

$$\text{Mean} = \frac{41+39+48+52+46+62+54+40+96+52+98+40+42+52+60}{15}$$
$$= \frac{822}{15} = 54.8$$

Number of observations $= 15$ (odd)

Median score $= 8$th number arranging in ascending order which is 52.

Maximum frequency $= 3$ of 52

$\therefore$ Mode $= 52..$

#464430
Topic: Median

The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x.

$29, 32, 48, 50, x, x+2, 72, 78, 84, 95$

Solution

Total observations $= 10$ (even)

Median $= \dfrac{10}{2} = 5$th & $\dfrac{10}{2} + 1 = 6^{th}$ observations

Median $= \dfrac{5^{th} + 6^{th} \text{ observations}}{2}$

$63 = \dfrac{x + x + 2}{2}$

$\Rightarrow x + 1 = 63$

$\Rightarrow x = 62$

#464433

Topic: Mode

Find the mode of $14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18$

Solution

Ascending order:

$14, 14, 14, 14, 17, 18, 18, 18, 22, 23, 25, 28$

14 has highest frequency : 4 times

Mode $= 14$

#464436

Topic: Mean

Salary (in `)	Number of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
Total	**60**

Find the mean salary of 60 workers of a factory from the following table:

Solution

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

Or

Mean $= \dfrac{\sum f_i x_i}{\sum f_i}$

$f_1 + f_2 + \cdots + f_8 = 16 + 12 + 10 + 8 + 6 + 4 + 3 + 1$

$x_1 + x_2 + \cdots + x_8 = 3000 + 4000 + 5000 + \dots$

$f_1 x_1 + f_2 x_2 + \cdots = 3000 \times 16 + 4000 \times 12 + \cdots$

Mean $= \dfrac{305000}{60} = 5083.33$

#464437

Topic: Median

Give one example of a situation in which

(i) the mean is an appropriate measure of central tendency.

(ii) the mean is not an appropriate measure of central tendency but the medians is an appropriate measure of central tendency.

Solution

(i) While if we take the case of calculating the weight of students in a class, then we should use mean rather than median. In such cases taking median is not suitable.

(ii) If the score of students in a class are $1, 2, 3, 4, 20$

So if we calculate the mean $= \dfrac{1+2+3+4+20}{5} = \dfrac{30}{5} = 6$

Median $= 3$

So, median is better or appropriate measure because 20 is much greater than other numbers and because of 20 the mean has come out to 6.

$\therefore$ Its better to take median than mean.

#465390
Topic: Mean

A survey was conducted by a group of students as a part of their environment awareness programme, in which they collected the following data regarding the number of plants in 20 houses in a locality. Find the mean number of plants per house.

Number of plants	$0-2$	$2-4$	$4-6$	$6-8$	$8-10$	$10-12$	$12-14$
Number of houses	1	2	1	5	6	2	3

Which method did you use for finding the mean, and why?

Solution

Calculating mean, we get

Mean, $\bar{x} = \dfrac{1}{n}\sum f_i x_i$

Here, $n = 20, \sum f_i x_i = 162$

Therefore, Mean, $\bar{x} = \dfrac{162}{20} = 8.1\,$plants

We have used direct method because numerical values of f and x are small.

No. of plants	No. of houses (f_i)	Mid - point (x_i)	$f_i x_i$
$0-2$	1	1	1
$2-4$	2	3	6
$4-6$	1	5	5
$6-8$	5	7	35
$8-10$	6	9	54
$10-12$	2	11	22
$12-14$	3	13	39
Total	20		162