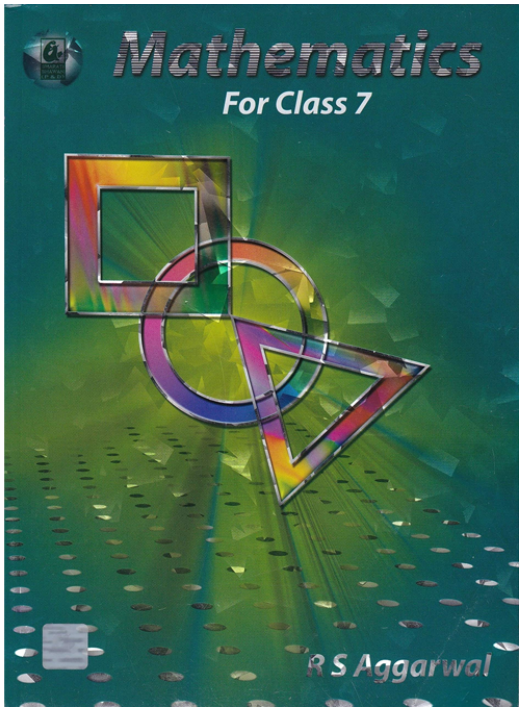
RS Aggarwal Solutions for Class 7 Maths Chapter 21–Collection and Organisation of Data (Mean, Median, and Mode)

Class 7 - Chapter 21 Collection and Organisation of Data (Mean, Median and Mode)



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RS Aggarwal Solutions for Class 7 Maths Chapter 21–Collection and Organisation of Data (Mean, Median, and Mode)

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RS Aggarwal Solutions for Class 7 Maths Chapter 21–Collection and Organisation of Data (Mean, Median and Mode)

RS Aggarwal 7th Maths Chapter 21, Class 7 Maths Chapter 21 solutions

Ex 21A

Question 1.

Solution:

(i) Data : A collection of numerical figures giving some particular type of information is called data

(ii) Raw data : Data obtained in the original form is called raw data.

(iii) Array : Arranging the numerical figures of a data in ascending or descending order is called an array.

(iv) Tabulation of data : Arranging the data in a systematic form in the form of a table is called tabulation of the data.

(v) Observations : Each numerical figure in a data is called an observation.

(vi) Frequency of an observation : The number of times a particular observation occurs is called its frequency.

(vii) Statistics : It is the subject that deals with the collection presentation analysis and interpretation of numerical data.

Question 2.

Solution:

Arranging the given data in ascending order is as given below :

1, 1, 2, 2, 2, 2, 2, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 6, 6 and 6 its frequency table will be as under:

Observation	1	2	3	4	5	6	Total
Frequency	2	5	1	4	6	2	20

Question 3.

Solution:

Arranging the given data in ascending order,

260, 260, 300, 300, 300, 300, 360, 360, 360, 360, 360, 360, 400, 400, 400.

and its frequency table will be as under.

Observation	260	300	360	400	Total
Frequency	2	4	6	3	15

Question 4.

Solution:

Arranging the given data in ascending order we find

5, 5, 6, 6, 6, 6, 7, 7, 7, 7, 7, 7, 7, 8, 8, 8, 8, 8, 9, 9, 10, 10 and its frequency table will be as under.

Observations	5	6	7	8	9	10	Total
Frequency	2	4	7	5	2	2	22

Question 5.

Solution:

(i) Data means information in the form of numerical figures.

(ii) Data obtained in the original form is called raw data.

(iii) Arranging the numerical figures in ascending or descending order is called an array.

(iv) The number of times a particular observation occurs is called its frequency.

(v) Arranging the data in the form of a table is called tabulation of data.

Question 6.

Solution:

First five natural numbers are 1, 2, 3, 4, 5

$$\therefore \quad \text{Mean} = \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3$$

Question 7.

Solution:

First six odd natural numbers are 1, 3, 5, 7, 9, 11

$$\therefore \quad \text{Mean} = \frac{1+3+5+7+9+11}{6} = \frac{36}{6} = 6$$

Question 8.

Solution:

First seven even natural numbers are 2, 4, 6, 8, 10, 12, 14

$$\therefore \quad \text{Mean} = \frac{2+4+6+8+10+12+14}{7} = \frac{56}{7} = 8$$

Question 9.

Solution:

First five prime numbers are 2, 3, 5, 7, 11

$$\therefore \quad \text{Mean} = \frac{2+3+5+7+11}{5} = \frac{28}{5} = 5.6$$

Question 10.

Solution:

First six multiples of 5 are 5, 10, 15, 20, 25, 30

$$\therefore \text{ Mean} = \frac{5+10+15+20+25+30}{6} = \frac{105}{6} = 17.5$$

Question 11.

Solution:

Weight (intag) x_1	Number of workers f_i	$x_1 \times f_i$
60	4	240
63	5	315
66	3	198
72	1	72
75	2	150
Total	15	975

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{975}{15} = 65 \text{ kg}$$

Question 12.

Solution:

Daily wages (in Rs.) x_i	Number of workers f_i	$x_i \times f_i$
140	14	1960
150	16	2400
160	15	2400
180	7	1260
190	8	1520
Total	60	9540

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{9540}{60} = 159$$

Mean = Rs. 159

Question 13.

Solution:

Daily wages (in Rs.) x_i	Number of workers f_i	$x_i \times f_i$
280	14	3920
300	16	4800
320	15	4800
360	7	2520
380	8	3040
Total	60	19080

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{19080}{60} = 318$$

Mean = Rs. 318

Question 14.

Solution:

Age (24 years) x_i	Number of players f_i	$x_i \times f_i$
14	15	210
15	14	210
16	10	160
17	8	136
18	3	54
Total	50	770

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{770}{50} = 15.4 \text{ years}$$

Question 15.

Solution:

Height (in cm) x_i	Number of boys f_i	$f_i \times x_i$
165	9	1485
170	8	1360
175	11	1925
180	12	2160
Total	40	6930

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{6930}{40} = 173.25 \text{ cm}$$

Ex 21B

Question 1.

Solution:

(i) Arranging in ascending order.

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

Here number of terms = 9 which is odd

Median= n+12 = 9+12 th term

= 5th term = 7

Hence median = 7

(ii) Arranging in ascending order,

6, 8, 9, 15, 16, 18, 21, 22, 25

Here, number of terms (n) = 9 which is odd

Median= n+12 = 9+12 th term

= 5th term = 16

(iii) Arranging in ascending order,

6, 8, 9, 13, 15, 16, 18, 20, 21, 22, 25 Here number of terms (n) = 11 which is odd

Median= n+12 = 11+12 th term

= 6th term = 16

Question 2.

Solution:

(i) Arranging in ascending order,

9, 10, 17, 19, 21, 22, 32, 35

Here, number of terms = 8 which is even

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

$$= \frac{1}{2}\left\{\frac{8}{2}\text{th term} + \left(\frac{8}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}(4\text{th term} + 5\text{th term}) = \frac{1}{2}(19+21)$$

$$= \frac{1}{2} \times 40 = 20 \text{ Ans.}$$

(ii) Arranging in ascending order,

29, 35, 51, 55, 60, 63, 72, 82, 85, 97

Here, number of terms = 10 which is even

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

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

$$= \frac{1}{2}(5\text{th term} + 6\text{th term})$$

$$= \frac{1}{2}(60+63) = \frac{1}{2} \times 123$$

$$= 61.5$$

Question 3.

Solution:

First 15 odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29.

Here, number of terms (n) = 15 which is odd

Median = n+12 = 15+12 th term

= 8th term = 15

Question 4.

Solution:

First 10 even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Here, number of terms = 10 which is even

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

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

$$= \frac{1}{2}\{5\text{th term} + 6\text{th term}\}$$

$$= \frac{1}{2}(10 + 12) = \frac{1}{2} \times 22 = 11$$

Question 5.

Solution:

First 50 whole numbers

0, 1, 2, 3, 4, …, 49

Here, number of terms = 50, which is even

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

$$= \frac{1}{2}\left\{\frac{50}{2}\text{ th term } + \left(\frac{50}{2}+1\right)\text{th term}\right\} = \frac{1}{2}\{25\text{th} + 26\text{th term}\}$$

$$= \frac{1}{2}(24 + 25) = \frac{1}{2} \times 49 = 24.5$$

Question 6.

Solution:

Arranging in ascending order,

17, 17, 19, 19, 20, 21, 22, 23, 24, 25, 26, 29, 31, 35, 40 .

Here, number of terms = 15 which is odd

Median = n+12 th term = 15+12 = 162 th

= 8th term = 23

Question 7.

Solution:

Arranging is ascending order,

31, 34, 36, 37, 40, 43, 46, 50, 52, 53

Here, number of terms = 10, which is even

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

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

$$= \frac{1}{2}\{40 + 43\} = \frac{1}{2} \times 83 = 41.5 \text{ years}$$

Question 8.

Solution:

Preparing the cumulative frequency table

Weight (in kg) x	Number of Boys (f)	$c.f.$
45	8	8
46	5	13
48	6	19
50	9	28
52	7	35
54	4	39
55	2	41

Here, number of terms (N) = 41, which is odd

Median = n+12 th term

= 41+12 = 422 th = 21 th term = 50kg (value of 20 to 28 = 50)

Hence median = 50kg

Question 9.

Solution:

Arranging in order and preparing the cumulative frequency table.

Here, number of terms (N) = 37 which is odd.

Median = n+12 th term

= 37+12 = 382 th term

= 19th term = 22 (Value of 18 to 21 = 22)

Hence median = 22

Question 10.

Solution:

Arranging in order and then preparing its cumulative frequency table :

Height (in cm) (x)	Number of students (f)	$c.f.$
151	6	6
152	3	9
153	12	21
154	4	25
155	10	35
156	8	43
157	7	50

Here, number of terms (N) = 50, which is even

$$\text{Median} = \frac{1}{2}\left\{\frac{1}{2}\text{th term} + \left(\frac{N}{2}+1\right)\text{ term}\right\}$$

$$= \frac{1}{2}\left\{\frac{50}{2}\text{th term} + \left(\frac{50}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{25\text{th term} + 26\text{th term}\}$$

$$= \frac{1}{2}\{154 + 155\} \{\because \text{Value of 25th} = 154 \text{ value of 26 to 35} = 155\}$$

$$= \frac{1}{2} \times 309 = 154.5\text{cm}$$

Hence median = 154.5 cm

Ex 21C

Question 1.

Solution:

(i) Arranging in ascending order :

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

We see that 8 occurs maximum times

Mode = 8

(ii) Arranging in ascending order :

18, 21, 23, 27, 27, 27, 27, 27, 36, 39, 40

We see that 27 occurs maximum times

Mode = 27

Question 2.

Solution:

Arranging in ascending order :

28, 31, 32, 32, 32, 32, 34, 36, 38, 40, 41.

We see that 32 occurs maximum times

Mode = 32 years

Question 3.

Solution:

We prepare the table as given below:

Daily wages (in Rs.) x	No. of workers f	$c.f.$	$x \times f$
300	6	6	1800
375	8	14	3000
450	9	23	4050
525	12	35	6300
600	10	45	6000
Total	45		21150

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{21150}{45} = 470$$

Here, number of terms = 45, which is odd

Median = n+12 th term = 45+12 = 462 th term

= 23th term = 450

Now, mode = 3(median) – 2(mean)

= 3 x 450 – 2 x 470

= 1350 – 940

= 410

Question 4.

Solution:

We prepare the table as given below:

Marks obtained (x)	No. of students (f)	$c.f.$	$x \times f$
15	2	2	30
17	5	7	85
20	10	17	200
22	12	29	264
25	8	37	200
30	4	41	120
Total	41		899

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{899}{41} = 21.92$$

Here, number of terms (N) = 41, which is odd

Median = n+12 th term = 41+12 th term

= 422 = 21 th term = 22 {value of 18 to 29 = 22}

Mode = 3 (median) – 2 (mean)

= 3 x 22 – 2 x 21.92 = 66 – 43.84 = 22.16

Question 5.

Solution:

We prepare the table as given below:

Weight (in kg) (x)	Number of players (f)	$c.f.$	$x \times f$
48	4	4	192
50	3	7	150
52	2	9	104
54	2	11	108
58	1	12	58
Total	12		612

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{612}{12} = 51$$

Here number of terms (N) = 12, which is even.

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

$$= \frac{1}{2}\left\{\frac{12}{2}\text{th term} + \left(\frac{12}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{6\text{th term} + 7\text{th term}\}$$

$$= \frac{1}{2}(50 + 52) = \frac{1}{2} \times 102 = 51$$

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$
$$= 3 \times 51 - 2 \times 51$$
$$= 153 - 102 = 51$$

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Somalwada
Nagpur - 440015
Maharashtra, India

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