Chapter # 4

STATISTICS

EXERCISE 4.1

Q.1 ***Answer the following questions using the given table:***

Marks Obtained	*Number of Students*
1 – 15	*5*
16 – 30	*23*
31 – 45	*18*
46 – 60	*11*
61 – 75	*3*

(i) ***How many class intervals are there?***

(ii) ***What is the lower limit in the interval (16 –30)?***

(iii) ***What is the class frequency of (46 – 60)?***

(iv) ***What is the number of students securing marks from (31 – 60)?***

(v) ***What is the magnitude of class-interval (16 –30).***

(vi) ***What is the upper limit of class-interval having as class frequency?***

(vii) ***What is the number of students securing marks from (15 to 16)?***

(viii) ***What is the magnitude of class-interval?***

(ix) ***In which class interval is the least number of students?***

(x) ***How many students secure marks from 1 to 75?***

Solution:

(i) There are five class-intervals.

(ii) Lower limit is 16.

(iii) Class frequency is 11.

(iv) Number of students securing 11 to 60 marks $= 18 + 11 = 29$.

(v) Magnitude of class-interval is 15.

(vi) Upper limit is 45.

(vii) Magnitude of class-interval is 15.

(viii) Least number of students in class-interval is $61-75$.

(ix) Number of students securing marks from 1 to 75 $- 5 + 23 + 11 - 3 = 60$.

Q.2 ***Prepare a frequency distribution table with the help of the following.***

8, 15, 25, 16, 12, 9, 1, 23, 14, 21, 4, 22, 11, 3, 2, 7, 17, 25, 13

Fix the magnitude of class-intervals and tell the number of class-intervals.

Solution:

(1) Number of classes = 5

(2) Number of class intervals = 5

Class-Intervals	*Magnitude*
$1 - 5$	5
$6 - 10$	3
$11 - 15$	5
$16 - 20$	2
$21 - 25$	5

Q.3 ***The weights (in kilograsm) of the players of a school are as follows:***

50, 51, 52, 58, 57, 55, 54, 56, 56, 58, 52, 55, 53, 58, 56, 53, 53, 52, 54, 57, 52, 54, 53, 52.

Using tally method prepare the frequency distribution table with a class-interval of 2 kilogram. Also find the class frequency of the class-intervals $(52-53)$.

Solution:

Least weight = 50 kg
Highest weight = 55 kg
Class-interval = 5

Frequency Distribution Table

Class-Intervals	*Tally Marks*	*Frequency*
50 – 51	//	*2*
52 – 53	///	*3*
54 – 55	////	*4*
56 – 57	/////	*5*
58 – 59	///	*3*

Frequency of class-interval (*52 – 53*) is *3*.

Q.4 ***A group of 10th class students secured the following marks in a practical examination.***

35, 40, 45, 38, 45, 35, 49. 48, 45, 3, 5, 14, 37, 42, 41, 20, 14, 1, 8, 46, 8

Prepare a frequency distribution table taking 10 as magnitude of class interval. From the table find the class interval with the least class frequency.

Solution:

Least marks secured = *1*
Highest marks secured = *49*
Class interval = *10*

Frequency Distribution Table

Class Interval	*Tally Marks*	*Frequency*
1 – 10	𝍸	*5*
11 – 20	///	*3*
21 – 30	*X*	*0*
31 – 40	𝍸	*2*
41 – 40	𝍸///	*8*

Class-interval having the least class frequency is *21 – 30.*

Q.5 ***The students with the following roll numbers were present in a class when the roll call was taken:***

1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 16, 17, 18, 20, 21, 23, 25, 26, 28, 29, 30, 34, 36, 38, 39, 43, 44, 46, 48, 50, 52, 57, 58, 60.

Prepare a frequency distribution table with groups of tens and find. In which group the presence was best?

Solution:

Frequency Distribution Table

Class-Interval (group)	Frequency
1 – 10	8
11 – 20	6
21 – 30	7
31 – 40	4
41 – 50	5
51 – 60	4

Best presence was in group 1 – 10.

Q.6 ***In a factory monthly salary (in rupees) of 40 workmen is:***

310, 350, 370, 320, 380, 390, 400, 398, 399, 326, 337, 348, 359, 361, 372, 389, 309, 340, 335, 304, 302, 317, 345, 350, 301, 354, 340, 400, 365, 335, 375, 342, 332, 325, 376, 374, 338, 368, 382

Taking 15 as magnitude of class interval prepare a frequency distribution table and find the number of workmen drawing Rs. 331 to 345.

Solution:

Frequency Distribution Table

Salary of workmen	Tally marks	Frequency
301 – 315	𝍸	5
316 – 330	////	4

331 – 345	卌 卌	*10*
346 – 360	卌	*5*
361 – 375	卌//	*7*
376 – 309	卌/	*6*
391 – 408	////	*3*

There are 10 workmen drawing pay Rs. 531 to 345.

Q.7 ***Consult the given table to tell which of the following statements are true and which of them are false. Write the false statements in correct from:***

Salary of Employees (in ruppes)	*Number of Employees*
400 – 420	*11*
420 – 440	*16*
440 – 460	*65*
460 – 480	*12*
480 – 500	*35*
500 – 520	*20*

(i) The lower limit in (400 to 420) is 400.
(ii) The upper limit 440 is included in (420 – 440).
(iii) The number of employees drawing Rs. (400 - 520) is 159.
(iv) The class frequency is the greatest in class interval (440 - 460).
(v) The interval with the least class frequency is (450 to 480).

Solution:

(i) Wrong, Lower limit is 400.
(ii) Right (iii) Right
(iv) Right (v) Wrong
Class interval with least frequency is (400–420).

Q.7 ***Prepare a frequency distribution table with the following data when (0 to 8) (8 to 16) are the class intervals: etc***
5, 40, 47, 0, 4, 11, 8, 16, 24, 32, 40, 0, 1,

23, 35, 28, 23, 16, 6, 12, 10, 11, 25, 29, 30, 31, 45, 44, 31, 34, 14, 15, 20, 19, 18, 17, 25, 26, 30, 11, 46, 16, 9, 8, 30, 31.

Solution:

Frequency Distribution Table

Class-Intervals	*Tally marks*	*Frequency*
0 – 8	𝍸	*6*
8 –16	𝍸 𝍸	*10*
16 – 24	𝍸 ////	*9*
32 – 40	////	*3*
40 – 48	𝍸	*5*
Total	***45***	***45***

EXERCISE 4.2

Q.1 Find Arithmetical mean:

(i) 2, 3, 4, 5, 6, 7, 8, 9, 10

(ii) 39, 28, 12, 36, 41, 18, 20, 37, 46, 43

(iii) 3005, 3007, 3004, 3008, 2015, 3003

(iv) 4.3, 8.9, 4.4, 12.9, 18.7

Solution:

(i) Arithmetic mean

$$= \frac{\Sigma x}{n}$$

$$= \frac{2+3+4+5+6+7+8+9+10}{9}$$

$$= \frac{54}{9} = 6 \quad \textit{Ans}$$

(ii) Arithmetic mean

$$= \frac{\Sigma x}{n}$$

$$= \frac{39+28+12+36+41+18+20+37+46+43}{10}$$

$$= \frac{320}{10} = 32 \quad \textit{Ans}$$

(iii) Arithmetic mean

$$= \frac{\Sigma x}{n}$$

$$= \frac{3005+3007+3004+3008+3015+3003}{6}$$

$$= \frac{18042}{6} = 3007 \quad \textit{Ans}$$

(iv) Artihmetic mean

$$= \frac{\Sigma x}{n}$$

$$= \frac{4.3+8.9+6.4+12.9+18.7}{5}$$

$$= \frac{51.2}{5} = 10.24 \quad \textbf{Ans}$$

Q.1 ***There are 8 sections of ninth class in a school. The number of students in them is 56, 46, 65, 53, 60, 64, 59 and 61 respectively. Find A.M of the number of students in these sections.***

Solution:

$$A.M = \frac{\Sigma x}{x}$$

$$= \frac{56+46+65+53+60+64+59+61}{8}$$

$$A.M = \frac{464}{8} = 58 \quad \textbf{Ans}$$

Q.3 ***Nasir accured 3, 4, 0, 6, 3 and 2 goals respectively in 6 matches of football. Find their A.M.***

Solution:

$$A.M = \frac{\Sigma x}{x}$$

$$= \frac{3+4+0+6+3+2}{6}$$

$$= \frac{18}{6} = 3 \quad \textbf{Ans}$$

Q.4 ***Find Σf, x, Σfx, D and ΣfxD in the form of a table from the given grouped data (x stands for central value. D for deviation and f for frequency).***

Marks Obtained	No. of students
1 – 5	10
6 – 10	12
11 – 15	14
16 – 20	16

Class intervals	No. of Students	Central Value			
	(f)	(x)	$f \times x$	$x - 18$	$f \times D$
$1-5$	10	$\frac{1+5}{2} = 3$	$10 \times 3 = 30$	$3-18 = -15$	$10 \times (-15) = -150$
$6-10$	12	$\frac{6+10}{2} = 8$	$12 \times 8 = 96$	$8-18 = -10$	$12 \times (-10) = -120$
$11-15$	14	$\frac{11+15}{2} = 13$	$14 \times 13 = 182$	$13-18 = -5$	$14 \times (-5) = -70$
$16-20$	16	$\frac{16+20}{2}$	16×18	$18-18$	$16 \times 0 = 0$
	$\Sigma f = 52$	$x =$	$\Sigma fx = 596$		$\Sigma fD = -340$

Answers:

$\Sigma f = 52$

$x = 3, 8, 13, 18$

$\Sigma fx = 596$

$D = -15, -10, -5.8$

when provisional mean is 18

$\Sigma f \times D = -340$

Q.5 *90 workmen work in a factory. The scheme of their daily wages is given below. Find A.M of their wages.*

Wages (in Rupees): x	12	15	18	21	24	27
No. of Labourers: f	10	20	30	5	15	10

Solution:

Wages (in Rupees) x	No. of Labourers f	$f \times x$
12	10	$12 \times 10 = 120$
15	20	$15 \times 20 = 300$
18	30	$18 \times 30 = 540$

21	5	$21 \times 5 = 105$
24	15	$24 \times 15 = 360$
27	10	$27 \times 10 = 270$
	$\Sigma f = 90$	$\Sigma fx = 1695$

$$A.M = \frac{\Sigma f \times x}{\Sigma f}$$

$$= \frac{1695}{90}$$

$= 18.83$ Rupees ***Ans***

Q.6 ***Find the A.M in each of the following.***

(i) ***7, 9, 0, −9, −7***

(ii) ***8, 9, 10, 0, −9, −6***

(iii) ***−110, −100, 0, 80, 30, 10***

Solution:

(i) $$A.M = \frac{\Sigma x}{n}$$

$$= \frac{7+9+0-9-7}{5}$$

$$= \frac{0}{5} = 0 \quad \textbf{Ans}$$

(ii) $$A.M = \frac{\Sigma x}{n}$$

$$= \frac{8+9+10+0-9-6}{6}$$

$$= \frac{12}{6} = 2 \quad \textbf{Ans}$$

(iii) $$A.M = \frac{\Sigma x}{n}$$

$$= \frac{110+(-100)+0+80+30+10}{6}$$

$$= \frac{-110-100+0+80+30+10}{6}$$

$$= \frac{-90}{6}$$

$$= -15 \quad \textit{Ans}$$

Q.7 ***The ages of 22 teachers of a school are given below. Find A.M of their ages.***

Ages in Years	*Number of Techers*
26 – 30	8
31 – 35	4
36 – 40	3
41 – 45	5
46 – 50	2

Solution:

Ages in years	*Central value* x	*No. of teachers* f	$f \times x$
26 – 30	$\frac{26+30}{2} = 28$	8	$28 \times 8 = 224$
31 – 35	$\frac{31+35}{2} = 33$	4	$33 \times 4 = 132$
36 – 40	$\frac{36+40}{2} = 38$	3	$38 \times 3 = 114$
41 – 45	$\frac{41+45}{2} = 43$	5	$43 \times 5 = 215$
46 – 50	$\frac{46+50}{2} = 48$	2	$48 \times 2 = 96$
		$\Sigma f = 22$	$\Sigma f \times x = 781$

$$A.M = \frac{\Sigma fx}{\Sigma f}$$

$$= 35.5$$

$$= \frac{781}{22}$$

$$= i.e$$

35 years and 6 months *Ans*

Q.8 ***The marks obtained by the students in an examination in the subject of Science are given in the table below. Find A.M of their marks.***

Marks obtained	*No. of students*
21 – 25	*80*
26 – 30	*125*
31 – 35	*75*
36 – 40	*215*
41 – 45	*85*
46 – 50	*20*

Solution:

Class Intervals	*No. of students (f)*	*General value (x)*	*D x − 3*	*F x D*
21 – 25	*80*	$\frac{21+25}{2}$ $= 23$	$23 - 33$ $= -10$	$80 \times (-10)$ $= -800$
26 – 30	*125*	$\frac{26+30}{2}$ $= 28$	$28 - 33$ $= -5$	$125 \times (-5)$ $= -625$
31 – 35	*75*	$\frac{31+35}{2}$ $= 38$	$33 - 33$ $= 5$	75×0 $= 1075$
36 – 40	*215*	$\frac{36+40}{2}$ $= 35$	$38 - 33$ $= 5$	215×5 $= 1075$
41 – 45	*85*	$\frac{41+45}{2}$ $= 43$	$43 - 33$ $= 10$	85×10 $= 850$
46 – 50	*20*	$\frac{46+50}{2}$ $= 48$	$48 - 33$ $= 15$	20×15 $= 300$
	$\Sigma f = 600$	*P.M = 33*		$\Sigma fd = 800$

$$A.M = PM + \frac{\Sigma f \times d}{\Sigma f}$$

$$\Rightarrow \quad AM = 33 + \frac{800}{600}$$

$$AM = 33 + 1.33$$

$$\Rightarrow \quad \boxed{AM = 34.33} \text{ Ans}$$

Q.9 ***In a factory the labourers get their wages according to the scheme given below. Find the A.M of their wages by short cut method.***

Wages (in rupees)	Number of Labourers
310 – 330	135
330 – 350	213
350 – 370	136
370 – 390	416

Solution:

Class Intervals	No. of Labourers (F)	Central value x	D $x = 340$	$f \times D$
310 – 330	135	$\frac{310 + 330}{2}$ $= 320$	320–340 $= -20$	$135 \times (-20)$ $= -2700$
330 – 350	213	$\frac{330 + 350}{2}$ $= 340$	340 – 340 $= 0$	$213 \times (0)$ $= 0$
350 – 370	136	$\frac{350 + 370}{2}$ $= 360$	360 – 340 $= 20$	136×20 $= 2720$
370 – 390	416	$\frac{370 + 390}{2}$ $= 380$	380 – 340 $= 40$	416×40 $= 16640$
	$\Sigma F = 900$			$\Sigma F \times d = 16650$

$$P.M = 340$$
$$\Sigma F \times d = 16660$$
$$\Sigma F = 900$$
$$A.M = P.M = \frac{\Sigma F \times d}{\Sigma F}$$
$$= 340 + \frac{16660}{900}$$
$$= 340 + 18.51$$
$$\boxed{= 358.51} \text{ Ans}$$

Q.10 ***The measurements (in decimeters) of the sizes of the children of a school are given in the table below. Find the A.M of their sizes.***

Size (in decimeter)	Number of Children
6.1 – 6.5	100
6.6 – 7.0	300
7.1 – 7.5	400
7.6 – 8.0	500
8.1 – 8.5	100

Solution:

Class Intervals	No. of Children (F)	Central value x	D $x = 7.3$	$F \times D$
6.1 – 6.5	100	$\frac{6.1+6.5}{2} = 6.3$	$6.3 - 7.3 = -1$	$100 \times (-1) = -100$
6.6 – 7.0	300	$\frac{6.6+7.0}{2} = 6.8$	$6.8 - 7.3 = -0.5$	$300 \times (-0.5) = -150$
7.1 – 7.3	400	$\frac{7.1+7.5}{2} = 7.3$	$7.3 - 7.3 = 0$	$400 \times 0 = 0$
7.6 – 8.0	500	$\frac{7.6+8.0}{2} = 7.8$	$7.8 - 7.3 = 0.5$	$500 \times 0.5 = 250$

$8.1 - 8.5$	100	$\frac{8.1 + 8.5}{2}$	$8.3 - 7.3$	$100 \times 1 = 100$
		$= 8.3$		$= 1$
$\Sigma F = 1400$	$P.M = 7.3$			$\Sigma F \times D = 100$

$$A.M = P.M = \frac{\Sigma F \times D}{\Sigma F}$$

$$= 7.3 + \frac{100}{1400}$$

$$= 7.3 + \frac{1}{14}$$

$$= 7.4 + 0.07$$

$$= 7.37$$

$$= 7.4 \text{ Ans}$$

EXERCISE 4.3

Q.1 Find the median in each of the following:

(i) 2, 5, 1, 4, 3

(ii) 2, 1, 6, 5, 3, 4

(iii) 21, 32, 48, 47, 48, 23, 10

(iv) 3, 2, 1, 0, −1, −2, −3

Solution:

(i) In assending order

$\underbrace{1, \quad 2,}_{2 \text{ terms}} \quad \underbrace{3,}_{\downarrow} \quad \underbrace{4, \quad 5}_{2 \text{ terms}}$

median

median = 3 ***Ans***

(ii) In ascending order

$\underbrace{1, \quad 2,}_{2 \text{ terms}} \quad \underbrace{3, \ 4,}_{\downarrow} \quad \underbrace{5, \quad 6}_{2 \text{ terms}}$

Median = A.M of middle terms

$= \frac{3+4}{2} = \frac{7}{2} = 3.5$ ***Ans***

(iii) In ascending order

$\underbrace{10, \ 21, \ 23}_{\text{three terms}} \quad \underbrace{32}_{\downarrow} \quad \underbrace{47, \ 48, \ 48}_{\text{three terms}}$

median

Median = 32 ***Ans***

(iv) In ascending order

$\underbrace{-3, \ -2, \ -1}_{\text{three terms}} \quad \underbrace{0}_{\downarrow} \quad \underbrace{1, \ 2, \ 3}_{\text{three terms}}$

median

Median = 0 ***Ans***

Q.2 ***According to the 1941 census the population of 10 villages is give below. Find their median.***

407, 594, 672, 522, 733, 777, 1490, 2488, 391, 387

Solution:

Population according to ascending order

$$\underbrace{387,\ 391,\ 407,\ 522}_{\text{four terms}}\ \underbrace{594,\ 672}_{\text{middle terms}}\ \underbrace{733,\ 777,\ 1490,\ 2488}_{\text{four terms}}$$

Median = A.M of middle terms

$$= \frac{594 + 672}{2}$$

$$= \frac{1266}{2} = 633 \quad \textit{Ans}$$

Q.3 ***53 boys standing in a row. Find their median.***

Solution:

53 boys in a row

$$\underbrace{1 \text{ to } 26 \text{ boys}}_{26 \text{ boys}}\ \underbrace{27}_{\text{median}}\ \underbrace{28 \text{ to } 53 \text{ boys}}_{26 \text{ boys}}$$

Median = 27 ***Ans***

Q.4 ***The number of attendence of a student in 6 months is 36, 46, 48, 20, 47, 45 respectively. Find the median of attendence.***

Solution:

Attendence in ascending order

$$\underbrace{20, \quad 36}_{\text{two terms}} \quad \underbrace{45, \quad 46,}_{\downarrow} \quad \underbrace{47, \quad 48}_{\text{two boys}}$$

middle terms

Median A.M of middle term

$$= \frac{45+46}{2} = \frac{91}{2} = 45.5 \quad \textit{Ans}$$

Q.5 ***Find the median of 1, 3, 6, 3, 5, 4, 3, 1, 4, 3.***

Solution:

Number in ascending order

$$\underbrace{1, \quad 1, \quad 3, \quad 3}_{\text{four terms}} \quad \underbrace{3, 3}_{\downarrow} \quad \underbrace{4, \quad 4, \quad 5, \quad 6}_{\text{four terms}}$$

median

median = 3 *Ans*

Q.6 ***The members of cricket team of a school made the following runs. Find their mode.***

10, 8, 0, 25, 13, 2, 0, 0, 1, 2, 5, 6

Solution:

Runs in ascending order

$$\underbrace{0, \quad 0, \quad 0}_{3 \text{ times}} \; 1, 2, 6, 8, 10, 13, 25, 2[illegible]$$

Hence mode = *0 Ans*

Q.7 ***8 persons work in a general store whose monthly wages (in rupees) are 300, 250, 275, 300, 300, 250, 300, 3[illegible]. Find the mode of their wages.***

Solution:

Wages in ascending order

250, 250, 275, 300, 300, 300, 300, 340

000 repeated 4 times

Hence mode = *300 Ans*

Q.8 ***There is a six-storey building. Its storeys contained 40, 50, 50, 55, 55, 55 rooms respectively. Find the mode of rooms.***

Solution:

40, 50, 50, 55, 55, 55

55 repeated 3 times

Hence mode = 55 ***Ans***



EXERCISE 4.4

Q.1 ***In a Secondary School Board Examination 50 students obtained the following marks, respectively in Mathematics.***

18, 15, 85, 63, 80, 75, 23, 10, 0, 93, 41, 0, 99, 100, 23, 66, 43, 48, 50, 60, 32, 33, 67, 97, 86, 77, 39, 16, 5, 14, 41, 51, 63, 70, 21, 11, 55, 58, 60, 98, 99, 95, 64, 13, 15, 30, 60, 45, 15, 28

Prepare frequency table taking 15 as magnitude of class interval.

Solution:

Class Interval	*Tally Marks*	*Frequency*
0 – 15	𝍸	*10*
16 – 20	𝍸 //	*7*
31 – 45	𝍸 ///	*8*
46 – 60	𝍸 ///	*8*
61 – 75	𝍸 //	*7*
76 – 90	////	*4*
91 – 105	𝍸 //	*7*
Total	*51*	*51*

Q.2 ***Measure the sizes (in decimeters) of 100 scouts are given below. Find the A.M of their sizes.***

Measures of sizes (in decimeters)	*No. of scouts*
8 – 10	*5*
10 – 12	*18*
12 – 14	*42*
14 – 16	*27*
16 – 18	*8*

Solution:

Frequency Distribution Table

Class interval	*Central value (x)*	*Frequency F*	*F × x*
8 – 10	$\frac{8+10}{2} = 9$	*5*	*5 × 9 = 45*
10 – 12	$\frac{10+12}{2} = 11$	*18*	*18 × 11 = 198*
12 – 14	$\frac{12+14}{2} = 13$	*42*	*42 × 13 = 546*
14 – 16	$\frac{14+16}{2} = 15$	*27*	*27 × 15 = 405*
16 – 18	$\frac{16+18}{2} = 17$	*8*	*8 × 17 = 136*
		ΣF = 100	*ΣF × = 1330*

$$A.M = \frac{\Sigma F \times x}{\Sigma F}$$

$$= \frac{1330}{100}$$

$$\boxed{= 13.3 \text{ years}}$$ ***Ans***

Q.3 ***The A.M of 10 numbers is 32. Find their sum.***

Solution:

$A.M = \frac{\Sigma x}{n}$ when Σx is the sum of number and n is the number of terms

$\therefore \quad \Sigma x = A.M \times n$

$\Sigma x = 10 \times 32$

Sum of Numbers = *320* ***Ans***

Q.4 ***30 students appeared in an examination 10 students obtained 70 marks each, 8 obtained 45 marks each and the rest of the students obtained 65 marks each. Find the mode of numbers.***

Solution:

Total number of students = 30
Students obtaining 70 marks each = 10
Students obtaining 45 marks each = 8
Students obtaining 65 marks each
$= 30 - (10 + 8) = 30 - 18 = 12$
As 65 has been repeated 12 times
$\therefore$ *Mode = 65* ***Ans***

Q.5 ***The population of the mohallas of a city is 700, 600, 650, 550, 760, 545, 670, 750, 700, 540. Find the median***

Solution:

Population figure in ascending order

540, 545, 550, 600 | *650, 670* | *700, 700, 750, 760*

4 terms | ↓ middle term | 4 terms

Median = A.M of middle term

$$= \frac{650 + 670}{2} = \frac{1320}{2}$$

$$= 660$$

Median = *660* ***Ans***

Q.6 ***Prepare the frequency distribution table of the following data taking 2 as magnitude of class intervals. Also find the A.M and the Mode.***

70, 68, 75, 67, 71, 68, 68, 74, 71, 68, 67, 70, 77, 76, 76, 69, 67, 66, 72, 73, 74, 71,

68, 69, 67, 76, 77, 69, 70, 77, 67, 74, 67, 68, 67, 68.

Solution:

Frequency Distribution Table

Class Interval	*Central value (x)*	*Frequency F*	*F × x*
66 – 67	$\frac{66+67}{2} = 66.5$	*8*	*8 × 66.5 = 532.*
68 – 69	$\frac{68+69}{2} = 68.5$	*10*	*10 × 68.5 = 685*
70 – 71	$\frac{70+71}{2} = 70.5$	*6*	*6 × 70.5 = 423*
72 – 73	$\frac{72+73}{2} = 72.5$	*2*	*2 × 72.5 = 145*
74 – 75	$\frac{74+75}{2} = 74.5$	*4*	*4 × 74.5 = 298*
76 – 77	$\frac{76+77}{2} = 76.5$	*6*	*6 × 76.5 = 459*
		$\Sigma F = 36$	$\Sigma Fx = 2542$

$$A.M = \frac{\Sigma Fx}{\Sigma F}$$

$$= \frac{2542}{36}$$

$$\boxed{= 70.61}$$ ***Ans***

To find mode write the numbers in ascending order.

66, $\underbrace{67, 67, 67, 67, 67, 67, 67}$ $\underbrace{68, 68, 68, 68, 68, 68, 68}$

69, 69, 69, 70, 70, 70, 71, 71, 71, 72, 73, 74, 74, 74, 75

76, 76, 76, 77, 77, 77

Mode is *67* or *68*

Answer:

A.M = *70*

$= 67$ or 68

Q.7 ***The scheme of measures or sizes (in decimeters) of the students of a school participating in a tournament is given below. Find the A.M of their ages.***

Size (in centimeter)	No. of students
60.0 – 60.4	50
60.4 – 60.8	115
60.8 – 61.2	30
61.2 – 61.6	60
61.6 – 62.0	75
62.0 – 62.4	130

Solution:

Class Intervals	No. of students (F)	Central value (x)	D x − 61	F × D
60.0 – 60.4	50	$\frac{60.0+60.4}{2}$ $= 60.2$	60.2 – 61 $= (-0.8)$	$50\times(-.8)$ $= -40$
60.4 – 60.8	115	$\frac{60.4+60.8}{2}$ $= 60.6$	60.6 – 61 $= (-0.4)$	$115\times(-0.4)$ $= -46$
60.8 – 61.2	30	$\frac{60.8+61.2}{2}$ $= 61.0$	61.0 – 61 $= 0$	$30\times 0 = 0$
61.2 – 61.6	60	$\frac{61.2+61.1}{2}$ $= 61.15$	61.15 – 61 $= 0.15$	$60\times 0.15=9$
61.6 – 62.0	75	$\frac{61.6+62.0}{2}$ $= 61.8$	61.8 – 61 $= 0.8$	$75\times 0.8 = 60$
62.0 – 62.4	130	$\frac{62.0+62.4}{2}$ $= 62.2$	62.2 – 61 $= 1.2$	130×1.2 $= 156$
	$\Sigma = 460$			$\Sigma f \times d = 139$

$$A.M = P.M + \frac{\Sigma f \times d}{\Sigma f} \begin{cases} \text{when } P.M = 61 \\ \Sigma fD = 139 \\ \Sigma f = 460 \end{cases}$$

$$A.M = 61 + \frac{139}{460} = 0.302$$

$$= 61 + 0.302$$

$$A.M = 61.3 \quad \textit{Ans}$$

Q.8 ***The A.M of the ages of 25 girls is 14 years and 2 months. Find the sum of their ages.***

Solution:

Number of girls = 25

A.M of their ages = 14 yearss 2 months as;

$$= 14\frac{2}{12} = 14\frac{1}{6} = \frac{85}{6}$$

$$A.M = \frac{\Sigma x}{n}$$

1. When Σx = sum of age
2. n is number of girls

or $\Sigma x = A.M \times n$

$$= \frac{85}{6} \times 25 = \frac{2125}{6} = 354^{1/2} \text{ years}$$

But 1/6 years = 2 months.

∴ Sum of the ages or Σx = 354 years 2 months. *Ans*

Q.9 ***The scheme of wages of 50 labourers of a factory is given below. Find the A.M of their wages.***

Wages (in rupees)	*Number of Labourers*
400 – 410	4
410 – 420	25
420 – 430	6
430 – 440	15

Solution:

Class intervals	No. of labourers F	Central value x	D x − 415	F × D
400 – 410	4	$\frac{400+410}{2}$ = 405	405 – 415 = – 10	4 × (–10) = – 40
410 – 420	25	$\frac{410+420}{2}$ = 415	415 – 415 = 0	25 × 0 = 0
420 – 430	6	$\frac{420+430}{2}$ = 425	425 – 415 = 10	6 × 10 = 60
430 – 440	15	$\frac{430+440}{2}$ = 435	435 – 415 = 20	15 × 20 = 300
	Σf = 50			Σfd = 320

$P.M = 415$

$\Sigma f = 50$

$\Sigma fd = 320$

$$A.M = P.M + \frac{\Sigma fd}{\Sigma f}$$

$$\text{or} \quad = 415 + \frac{320}{50} = 415 + 6.4$$

$A.M = 421.4$ rupees **Ans**

Q.10

Weight (in gram)	Number of students
51 – 54	150
54 – 57	75
57 – 60	300
60 – 63	125
63 – 66	50

With the help of the above table tell which of the following statements are true and which of them are false? Also correct the false statements.

(i) ***The table is divided into 5 class intervals.***

(ii) ***The lower limit of (57 to 60) is 60.***

(iii) ***The class frequency of (60 to 63) is not 125.***

(iv) ***The central value of (51 to 54) is 52.***

(v) ***The difference of lower limits (54 to 57) is 3.***

(vi) ***The number of students in (54 to 60) is 300.***

(vii) ***The class frequency of (63 to 66) is 50.***

(viii) ***The number of students in (51 to 66) is 600.***

(ix) ***The upper limit 63 is included in (60 to 63).***

(x) ***The class interval with the least class frequency is (54 to 57).***

Solution:

(i) Correct.

(ii) Incorrect as lower limit 60 is 57.

(iii) Incorrect as frequency of 60 − 63 is 125.

(iv) Incorrect as central value of 51 − 54 is 52.5.

(v) Correct.

(vi) Incorrect as the number is 375.

(vii) Correct.

(viii) Incorrect as the number of students is 700.

(ix) Incorrect as upper limit 63 is not included.

(x) Incorrect as the class interval with least frequency is 63 to 66.

