CHAPTER 18
MEAN , MEDIAN AND MODE OF UNGROUPED DATA

Exercise 18A

Answer1.

(i) The first eight natural numbers 0,1,2,3,4,5,6,7,8

$$\frac{(0+1+2+3+4+5+6+7+8)}{8}=\frac{36}{8}=4.5$$

(ii) The first ten odd numbers 1,3, 5, 7, 9, 11,13,17, 19 , 21

$$\frac{(1+3+5+7+9+11+13+15+17+19}{10}=\frac{100}{10}=10$$

(iii) The first seven multiples of 5 -- 5,10,15,20,25,30,35

$$\frac{(5+10+15+20+25+30+35)}{7}=\frac{140}{7}=20$$

(iv) All the factors of 20 - 1,2,4,5,10, 20

$$\frac{(1+2+4+5+10+20)}{6}=\frac{42}{6}=7$$

(v) All prime numbers between 50 and 80

There are only two 53,59,61,67,71,73,79

$$\frac{(53+59+61+67+71+73+79)}{7}=\frac{463}{7}=66\frac{1}{7}$$

Answer2

Given , 10 families of a locality are 2,4,3,4,2,0,3,5,1,6

$$\frac{(2+4+3+4+2+0+3+5+1+6)}{10}=3$$

Answer3

The numbers of books

$$\frac{105+216+322+167+273+405+346}{7}=\frac{1834}{7}=262$$

The mean is 262

Answer4
The daily temperature then mean ,

$$\frac{35.5+30.8+27.3+32.1+23.8+29.9}{6}=\frac{179.4}{6}=29.9$$

The mean is 29.9F

Answer5
Given , x, x+2, x+4, x+6 , x+8 is 13
So,

$$\frac{x+x+2+x+4+x+6+x+8}{5}=13$$

$$\Rightarrow\frac{5x+20}{5}=13$$

$$\Rightarrow 5x+20=65$$

$$\Rightarrow x=\frac{45}{5}=9$$

Therefore, according to questions :-
Last three observation is = x+4 = 9+4= 13
X+6= 9+6 = 15
X+8 = 9+8 = 17

Hence,

$$\frac{(13+15+19)}{3}=\frac{47}{3}=15$$

Answer6-
Given , the mean weight of 6 boys is 48
Let the weight of 6^{th} boy be x

So, the weights of 6^{th} boy =

Acc to mean

$$\frac{51+45+49+46+44+x}{6}=48$$

$$\Rightarrow 235+x=288$$

$$\Rightarrow x=288-235=53$$

So , the weight of 6th boy is 53kg.

Answer7:-
Given , the mean of marks scored by 50 students = 39
So, calculated mean is

$$50 \text{ X } 39 = 1950$$

So, the correct sum of these numbers
= [1950 – (wrong item) + (right item)]
= (1950 – 23 + 43)
= 1970

Therefore, the correct mean =

$$\frac{1970}{50} = 39.4$$

Answer8
Given, the mean of 24 numbers will be 35
Acc to question ,

Let the given numbers be x1, x2, x3,..... x24.
Then , the mean of these numbers =

$$\frac{x1+x2+x3+.....+x24}{24} = 35$$

$$x1 + x2 + x3..... + x24 = 35 \text{ X } 24 = 840$$

the new numbers are (x1+3),(x2+3),(x3+3) ..... (x24+3)

mean of the new number

$$\frac{(x1+3)+(x2+3).....(x24+3)}{24}$$

$$\Rightarrow \frac{(x1+x2+.....+x24)+72}{24}$$

$$\Rightarrow \frac{840+72}{24} = \frac{912}{24} = 38$$

Answer9-
Let the given numbers be x1, x2, x3,..... x20
Then, mean of these numbers =

$$\frac{(x1+x2+.....+x20)}{20} = 43$$

$$(x1+x2+x3+.....+x20) = 860$$

And the new numbers will be (x1-6),(x2-6),(x3-6)..... (x20-6)

Mean of new number =

$$\frac{(x1-6)+(x2-6)+(x3-6)+.....+(x20-6)}{20}$$

$$\Rightarrow \frac{(x1+x2+x3+.....+x20)-120}{20}$$

$$\Rightarrow \frac{860-120}{20}=\frac{740}{20}=37$$

Answer10-

Let the given numbers be x1, x2, x3,..... x15

Then, mean of these numbers =

$$\frac{(x1\ X\ 4)+(x2\ X\ 4)+(x3\ X\ 4)+.....+(x15\ X\ 4)}{15}=27$$

$$\Rightarrow (x1\ X\ 4)+(x2\ X\ 4)+(x3\ X\ 4)+.....+(x15\ X\ 4)=405 \quad .....(i)$$

And the new numbers will be (x1 X 4),(x2 X 4),(x3 X 4).....(x15 X 4)

Mean of new number =

$$\frac{(x1\ X\ 4)+(x2\ X\ 4)+.....+(x15\ X\ 4)}{15}$$

$$\Rightarrow \frac{(x1+x2+x3+....+x15)\ X\ 4}{15}$$

$$\Rightarrow \frac{(405\ X\ 4)}{15}=108$$

Answer11.

Let the given no. be x1,x2,x3.....x12

The mean of 12 numbers =

$$\frac{(x1+x2+x3+x4+.....+x12)}{12}=40$$

$$\Rightarrow x1+x2+x3+x4+.....+x12=480 \quad .....(i)$$

acc to question,

the new mean is calculated by –

$$\frac{(x1/8)+(x2/8)+(x3/8)+.....+(x12/8)}{12}$$

$$\Rightarrow \frac{(x1+x2+x3+x4+.....+x12)/8}{12}=\frac{480/8}{12}=5$$

Answer12

Let the given number be x1,x2,x3,x3,....x20

The mean of 20 numbers be =

$$\frac{(x1+x2+x3+.....+x20)}{20}=18$$

$$\Rightarrow x1+x2+x3+x4+.....+x20=360$$

Let the new mean acc to question

$$\frac{[(x1+3)+(x2+3)+(x3+3).....(x10+3)+(x11+x12+x13+.....+x20)}{20}$$

$$\Rightarrow \frac{(20\ X\ 18)+(3\ X\ 10)}{20}=\frac{390}{20}=\frac{39}{2}=19.5$$

Answer13.

Let the numbers be x1,x2,x3,x4,x5,x6

The mean of 6 no.s is

$$\frac{(x1+x2+x3+x4+x5+x6)}{6}=23$$

$$\Rightarrow x1+x2+x3+x4+x6=23\ X\ 6=138$$

The new mean is

$$\frac{(x1+x2+x3+x4+x5)}{5}=20$$

$$\Rightarrow x1+x2+x3+x4+x5=100$$

Acc to question the excluded no = 138-100

= 38

Answer14

Let the mean of 30 boys = 30 X 150= 4500

Acc to question -

The mean of correct height

$$(30\ X\ 150)-(wrong)+(correct)$$
$$=(30\ X\ 150)-135+165$$
$$=4530$$

So, the correct mean of 30 students will be

$$\frac{4530}{30}=151$$

Answer15

Let the mean weight of 34 students = 46.5 X 34= 1581kg

The weight of (34 students + 1 teacher) = 46.5 + 0.5 = 47

The mean weight of teacher & student = 47 X 35= 1645 kg

Acc to question , the weight of the teacher is

$$1645 - 1581 = 64kg$$

Answer16

Let mean weight of 36 students = 41 X 36 = 1476kg

The weight of student leave the class = (41-0.2)= 40.8kg

The mean weight now = 40.8 X 35 = 1428kg

Acc to question , the weight of the student

$$1476 - 1428 = 48kg$$

Answer17

Let mean of avg of weight = 39 X 40 = 1560

The weight of student after admitted into the class = 40-0.2= 39.8kg

The mean weight now = 39.8 X 40 =1592

Acc to question, the weight of new student =

$$1592 - 1560 = 32kg$$

Answer18

The mean of weight = 10 X 1.5 =15kg

Acc to question,

The weight calculated of new man = 15kg + 15kg = 73kg

Answer19

The mean of 8 nos = 35

Sum of these 8 nos = (35 X 8) =280

Mean of remaining 7 no.s be = 35-3= 32

Sum of these 7 nos = 32 X 7 = 224

Therefore,

The excluded no.s = 280-224 = 56

Answer20

The mean of 150 items is 60

Sum of these no.s = 60 X 150 = 9000

The correct mean = [9000- {(wrong1)+(correct1) – (wrong2) +(correct2)}

= 9000 -52-8+152+88

= 9180

So. The correct mean =

$$\frac{9180}{150} = 61.2$$

Answer21

The sum value of 31 = 31 X 60 = 1860

Acc to question,

The sum of first 16^{th} no = 58 X 16 = 928

The sum of last 16^{th} nos = 62 X 16 = 992

Acc to question ,

the 16^{th} result = (992+928) – 1860

= 1920 – 1860

= 60

Answer22

The sum value of 11 = 11 X 42 = 462

Acc to question ,

The sum of first 6 mean = 6 X 37 = 222

The sum of last 6 mean = 6 X 46 = 276

Acc to question,

The 6^{th} number

$$(222 + 276) - 462$$
$$= 498 - 462$$
$$= 36$$

Answer23

The sum value of 25 students = 25 X 52 = 1300

The mean weight of first 13 students = 48 kg

So, the sum value will be 48 X 13 = 624

The mean weight of last 13 students = 55kg

So, the sum value will be 55 X 13 = 715

Acc to question,

The weight of 13th students =

$$(624+715)-1300$$
$$=1339-1300$$
$$=39$$

Answer24
The mean of 25 observation = 80
The sum of value 25 X 80 = 2000

The mean value of another 55 observation = 60
The sum of value 60 X 55 = 3300

Acc to question,
The sum value of whole set = 2000+3300 = 5300
And the number of observation = 25+55 = 80

The mean will be

$$\frac{5300}{80}=66.25$$

Answer25
Let arun score no.s of marks in different subject is 36 , 44, 75, x.
Acc to question,

The average of marks

$$\frac{36+44+75+x}{4}=50$$
$$\Rightarrow 155+x=200$$
$$\Rightarrow x=200-155=45$$

Answer26
Let the distance of one side journey is covered by be xkm.
Then, the total distances will be = 2xkm.
Given, the ship sail out 15km/hr and sail back to starting point 10km/hr.

Total time =

$$\left(\frac{x}{15}+\frac{x}{10}\right)=\frac{5x}{30}=\frac{x}{6}hr$$

So, avg speed =

$$\{\frac{2x}{(x/6)}\}km/hr$$
$$=12km/hr$$

Answer27
The sum of 50 students avg weight of 44 = 50 X 44 = 2200
The sum girls 10 students avg weight of 40 = 400

Acc to question,
Let the avg sum of 40 boys weight =

$$2200-400$$
$$\Rightarrow 1800$$
$$\Rightarrow \frac{1800}{40}=45$$

Answer28
Acc to question,
Monthly expenditure of the family = 18720 X 3+20340 X 4+21780 X 5
= 56160+81360+108540
= 246060

And the saving of the family = 35340
So, income = expenditure + saving
= 246060+35340
= 281400

And the avg income is

$$\frac{281400}{12}=23450$$

Answer29
Let the avg payment of 75 workers weakly = 5680 X 75
Given ,
The avg payment of 25 workers = 25 X 5400
The avg payment of 30 workers = 30 X 5700

Acc to question,
Mean salary of 20 remaining

$$5680 \text{ X } 75 - (5400 \text{ X } 25 + 5700 \text{ X } 30)$$
$$= 426000 - (135000 + 171000)$$
$$= 426000 - 306000$$
$$= 120000$$

So,
Avg salary of 20 remaining =

$$\frac{120000}{2} = 6000$$

Answer30
Given, the mean marks of girls and boys will be 70 & 73
Let the required ratio will be x:1

So, the mean marks of all the students is
70x+73= 71(x+1)
X=2

So, the ratio will be 2:1
Answer31
Given, monthly salary of 20 workers = 45900 X 20
After adding manager salary ,
New avg salary = 49200 X 21

Acc to question,
Manager salary =

$$49200 \text{ X } 21 - 45900 \text{ X } 20$$
$$= 1033200 - 918000$$
$$= 115200$$

EXERCISE 18B

Answer1.

Xi	fi	Fi X xi
4	4	16
6	8	48
8	14	112
10	11	110
12	3	36
	$\sum fi = 40$	$\sum(fi \text{ X } xi) = 322$

So, the mean ,

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{322}{40} = 8.05$$

Answer2.

Xi	Fi	Fi X xi
60	4	240
63	3	189
66	2	132
69	2	138
72	1	72
	$\sum fi = 12$	$\sum(fi \text{ X } xi) = 771$

So, the mean

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{771}{12} = 64.25\text{kg}$$

Answer3

Xi	Fi	Fi X xi
34	5	170
37	10	370
40	17	680
43	12	516
46	6	276
	$\sum fi = 50$	$\sum(fi \text{ X } xi) = 2012$

So, the mean ,

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{2012}{50} = 40.24mm$$

Answer4

Xi	fi	Fi X xi
15	3	45

16	8	128
17	9	153
18	11	198
19	6	114
20	3	60
	$\sum fi = 40$	$\sum(fi \text{ X } xi) = 698$

So, the mean ,

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{698}{40} = 17.45yrs$$

Answer 5

Xi	Fi	fi X xi
10	7	70
30	8	240
50	10	500
70	15	1050
89	10	890
	$\sum fi = 50$	$\sum(fi \text{ X } xi) = 2750$

So mean is,

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{2750}{50} = 55$$

Answer6

Xi	Fi	Xi X f1
250	8	2000
300	11	3300
350	6	2100
400	10	4000
450	5	2250
	$\sum fi = 40$	$\sum(fi \text{ x } xi) = 13650$

So mean is,

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{13650}{40} = 341.25\text{rs}$$

Answer7

Xi	Fi	Xi X fi
10	6	60
15	8	120

20	P	20p
25	10	250
30	6	180
	$\sum fi =$ 30+p	$\sum(fi \text{ x } xi)$ =610+20p

So mean is 20.2(given),

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{610 + 20p}{30 + p} = 20.2$$

Cross multiply

610+20p = 20.2(30+p)

610+20p = 606+20.2p

610-606 = 20.2p-20p

4= 0.2p

20=p

Answer8

Xi	Fi	Xi X fi
3	6	18
5	8	40
7	15	105
9	P	9p
11	8	88
13	4	52
	$\sum fi =$ 41+p	$\sum(fi \text{ x } xi)$ =303+9p

Mean=8(given)

$$\bar{x} = \frac{\sum(fi \text{ X } xi)}{\sum fi} = \frac{303 + 9p}{41 + p} = 8$$

cross multiply

303+9p = 8(41+p)

303+9p = 328+8p

9p-8p = 328-303

P = 25

Answer9

Xi	Fi	xi X fi
15	8	120
20	7	140
25	P	25p
30	14	420
35	15	525
40	6	240

	$\sum fi =$ 50+p	$\sum(fi \times xi)$ =1445+25p

Mean 28.25(given),

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{1445 + 25p}{50 + p} = 28.25$$

Cross multiply,

1445+25p = 28.25(50+p)

1445+25p = 1412.5+28.25p

32.5=3.25p

$$\frac{32.5}{3.25} = p$$

10=p

Answer10.

Xi	Fi	Xi X fi
8	12	96
12	16	192
15	20	300
P	24	24p
20	16	320
25	8	200
30	4	120
	$\sum fi =$ 100	$\sum(f1 \times xi)$ =1228+24p

Mean=16.6(given),

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{1228 + 24p}{100} = 16.6$$

Cross multiply,

1228+24p = 16.6 X 100

1228+24p = 1660

24p = 1660-1228

24p = 432

$$P = \frac{432}{24}$$

P=18

Answer11,

Xi	Fi	Xifi
10	4	40
20	F1	20f1
30	8	240

40	F2	40f2
50	3	150
60	4	240
	$\sum fi =$ 19+f1+f2	$\sum(fi \times xi)$ =670+20f1+40f2

Here, $\sum fi =$ 19+f1+f2

But, $\sum fi = 35$

$\therefore$ 19+f1+f2=35 => f1+f2=16 ...(1)

Also mean ,

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{670+20f1+40f2}{19+f1+f2} = \frac{670+320+20f2}{19+16} \text{ [using...(i)]}$$

$$= \frac{990+20f2}{35}$$

But mean=34

$\therefore \frac{990+20f2}{35} = 34$

So, $f2$ =10

$\therefore$ f1=6

Answer 12

Xi	Fi	Xifi
10	17	170
30	$f1$	30f1
50	32	1600
70	$f2$	70f2
90	19	1710
	$\sum fi =$ 68+f1+f2	$\sum(fi \times xi)$ =3480+30f1+70f2

Here, $\sum fi =$ 68+f1+f2

But, $\sum fi = 120$

$\therefore$ 68+f1+f2 = 120 => f1+f2=52 ...(1)

f1 = 52-f2 ...(2)

Also mean ,

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{3480+30f1+70f2}{68+f1+f2} = \frac{3480+30(52-f2)+7f2}{68+52} \text{ [using...(1)&(2)]}$$

$$= \frac{3480+1560-30f2+70f2}{120}$$

MEAN= 50(given)

$$50 = \frac{5040+40f2}{120}$$

Cross multiply,

6000 = 5040 + 40f2

$$f2 = \frac{960}{40}$$

$$\therefore f2 = 28$$

&

$$f1 = 24$$

Answer 13

Xi	Fi	Xi X fi
15	2	30
17	3	51
19	4	76
20+p	5p	$100p+5p^2$
23	6	138
	15+5p	$295+100p+5p^2$

Mean = 20(given)

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{295 + 100p + 5p^2}{15 + 5p} = 20$$

Cross multiply

$295+100p+5p^2 = 20(15+5p)$

$295+100p+5p^2 = 300+100p$

$5p^2 = 300-295$

$5p^2 = 5$

$P^2 = \frac{5}{5}$

$P^2 = 1$

$\therefore p = 1$

Answer 14

Xi	Fi	xi X fi
10	17	170
30	5a+3	150a+90
50	32	1600
70	7a-11	490a-770
90	19	1710

	$\sum fi =$ 60+12a	$\sum(fi \times xi)$ =2800+640a

Mean = 50(given)

$$\bar{x} = \frac{\sum(fi \times xi)}{\sum fi} = \frac{2800+640a}{60+12a} = 50$$

Cross multiply

2800+640a = 50(60+12a)

2800+640a = 3000+600a

640a-600a = 3000-2800

40a = 200

a=5

$\therefore f_{30} = 28$ & $f_{70} = 24$

EXERCISE 18C

Answer1

(i) Arranging the nos in ascending order
2,2,3,5,7,9,9,10,11
Here, n = 9 which is odd.

Therefore, median score = Value of (9+1/2)th term
value of 5^{th} term = 7

(ii) Arranging the nos in ascending order
6,8,9,15,16,18,21,22,25

Here n= 9
Therefore, median score = Value of (9+1/2)th term
value of 5^{th} term = 16

(iii) Arranging the nos in ascending orders
6,8,9,13,15,16,18,20,21,22,25

Here n = 11
Therefore, median score = Value of (11+1/2)th term
value of 6^{th} term = 16

(iv) Arranging the nos, in ascending orders
0,1,2,2,3,4,4,5,5,7,8,9,10

Here n = 13
Therefore, median score = Value of (13+1/2)th term
value of 7^{th} term = 4

Answer2

(i) Arranging the nos. in ascending order
9,10,17,19,21,22,32,35

Here n = 8
Therefore the median score = value of (8/2)th term and (8/2 +1)th term

= avg of 4^{th} and 5^{th} terms
=

$$= \frac{1}{2}(19+21) = 20$$

(ii) Arranging the nos. in ascending order
29,35,51,55,60,63,72,82,85,91
Here n = 10
Therefore the median score = value of (10/2)th term and (10/2 +1)th term
= avg of 5^{th} and 6^{th} terms
=
$$\frac{1}{2}(60+63) = 61.5$$

(iii) Arranging the nos. in ascending order
3,4,9,10,12,15,17,27,47,48,75,81

Here n=12
Therefore the median score = value of (12/2)th term and (12/2 +1)th term
= avg of 6^{th} and 7^{th} terms
=
$$\frac{1}{2}(15+17) = 16$$

Answer3
Let arrange marks of 15 students in ascending order
17,17,19,19,20,21,22,23,24,25,26,29,31,35,40

n = 15
therefore median score = value of (15+1/2)
the value of 8^{th} = 23

Answer4-
let arrange heights of 9 students
144,145,147,148,149,150,152,155,160

N= 9
Therefore median score = value of (9+1/2)
The value of 5^{th} = 149cm

Answer5:-
Let arrange weight (in kg) of 8 children are
9.8, 10.6 , 12.7 , 13.4 ,14.3 , 15 , 16.5 , 17.2

N=8
There median score =1/2{ value of (8/2)th + value of (8+1/2)th}
The value of 4th and 5th =

$$\frac{1}{2}(13.4+14.3)=13.85$$

Answer6-
Let arrange the ages of 10 teachers
32,34,36,37, 40,44,47,50,53,54

N= 10
There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5th and 6th =

$$\frac{1}{2}(40+44)=42\,yrs$$

Answer7:-
Given series
10,13,15,18, x+1 , x+3 , 30 ,32 ,35 ,41

N=10 and median 24

There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5th and 6th =

$$24=\frac{1}{2}\{(x+1)+(x+3)\}$$
$$48=2x+4$$
$$2x=44$$
$$x=22$$

Answer8
Given series 26,29,42,53,x, x+2 ,70 ,75 ,82 ,93
N= 10 and median = 65

There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5th and 6th =

$$65=\frac{1}{2}\{x+(x+2)\}$$
$$65=\frac{1}{2}(2x+2)$$
$$130=2x+2$$
$$2x=130-2=128$$
$$x=64$$

Answer9
Given series 50,42,35,(2x+10),(2x-8),12,11,8
N= 10 and median = 25
There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5^{th} and 6^{th} =

$$25 = \frac{1}{2}\{(2x+10)+(2x-8)\}$$
$$50 = (2x+10)+(2x-8)$$
$$50 = 4x+2$$
$$4x = 48$$
$$x = 12$$

Answer10
Let arrange the series in ascending order
33,35,41,46, 55, 58,64,77,87,90,92
N= 11

The median score = the value of (11+1/2)
The value of 6^{th} = 58

Acc to question,
33,35,,46, 58,61, 64,75,77,87,90,92

N= 11
The median score = the value of (11+1/2)
The value of 6^{th} = 64

EXERCISE 18D

Answer1
Arranging the given data in an ascending order, we get
0,0,1,2,3,4,5,5,6,6,6,6

Here, 6 occurs most often
Hence, mode of the given data = 6

Answer2
Arranging the given data in an ascending order, we get
15,20,22,23,25,25,25,27,40

Here, 25 occurs most often
Hence, mode of the given data = 25

Answer3
Arranging the given data in an ascending order, we get
1,1,2,3,3,4,5,5,6,6,7,8,9,9,9,9,9,9

Here, 9 occurs most often
Hence, mode of the given data = 9

Answer4
Arranging the given data in an ascending order, we get
9,19,27,28,30,32,35,50,50,50,60

Here, 50 occurs most often
Hence, mode of the given data = 50

Answer5
The sum of the mean value

$$\frac{3+21+25+17+(x+3)+19+(x-4)}{7}=18$$

$$3+21+25+17+3+19-4+2x=18*7$$

$$2x+84=126$$

$$2x=126-84=42$$

$$x=21$$

so, x+3 = 21+3 = 24
x-4 = 21-4 = 17

here ,
3,17,17,19,21,24,25

Here, 17 occurs most often
Hence, mode of the given data = 17

Answer6
The arranging the given data in an ascending order , we get
52,53,54,54,(2x+1),55,55,56,57

N= 9
The median value = the value (9+1/2)
55 = 2x+1
2x = 54
X = 27

So, the value 2x+1 = 2 X 27+1
= 54

So, the series be 52,53,54,54,54,55,55,56,57
Here 54 occurs most often

Hence, mode of the given data = 54
Answer7
Let the series be

$$\frac{24+15+40+23+27+26+22+25+20+(x+3)}{10}=25$$

$$222+(x+3)=250$$

$$x+3=250-222$$

$$x+3=28$$

$$x=28-3=25$$

Then the median will be
Arranging the series in ascending order 15,20,22,23,24,25,25,26,27,40
N= 10
There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5th and 6th =

$$\frac{1}{2}(24+25)$$

$$=\frac{1}{2}(49)$$

$$=24.5$$

Answer8
Given, median = 45
Series be = 42,43,44,44,(2x+3),45,45,46,47
N= 9
Therefore, median score = Value of (9+1/2)th term
value of 5th term = (2x+3)

$$45 = (2x + 3)$$
$$\Rightarrow 2x = 45 - 3 = 42$$
$$\Rightarrow x = \frac{42}{2} = 21$$

The series will be, 42,43,44,44,45,45,45,46,47
And mode is most occurring numbers in series is 45

MULTIPLE-CHOICE QUESTIONS

Answer1(c)
Acc to question,

$$\frac{x+(x+2)+(x+4)+(x+6)+(x+8)}{5}=11$$

$$\Rightarrow \frac{5x+20}{5}=11$$

$$\Rightarrow 5x+20=55$$

$$\Rightarrow 5x=55-20=35$$

$$\Rightarrow x=\frac{35}{5}=7$$

Answer2(c)
Acc to question, the mean be

$$\frac{x+(x+3)+(x+5)+(x+7)+(x+10)}{5}=9$$

$$\Rightarrow \frac{5x+25}{5}=9$$

$$\Rightarrow 5x=45-25$$

$$\Rightarrow x=4$$

So, the series of last 3 observation be 9,11,14
So, calculated mean =

$$\frac{9+11+14}{3}=\frac{34}{3}=11\frac{1}{3}$$

Answer3(b)
Given ,

$\bar{x}$ is the mean of the x1,x2,x3,.....xn

Then

$$\sum_{i=1}^{n}(xi-\bar{x})=(x1-\bar{x})+(x2-\bar{x})+(x3-\bar{x})+.....+(xn-\bar{x})$$

$$=(x1+x2+x3+.....n)-n\bar{x}=(n\bar{x}-n\bar{x})=0$$

Answer4(b)
Let the mean of n observation x1,x2,x3,.....,xn be $\bar{x}$

If each observation is decreased by P then new mean = $(\bar{x}-P)$

Answer5(c)
Acc to question,

$$\frac{51+45+49+46+44+x}{6}=48$$

$$\Rightarrow \frac{235+x}{6}=48$$

$$\Rightarrow x=288-235=53kg$$

Answer6(b)
The mean value of 50 students = 50 X 39=1950
Acc to question ,
The correct mean = $\frac{\text{1950-wrong +correct}}{50}$

$$\Rightarrow \frac{1950-23+43}{50}=\frac{1970}{50}=39.4$$

Answer7(c)
The sum value 100 items mean = 64 X 100= 6400
Correct sum =

$$6400+36+90-26-9=6491$$

So, correct =

$$\frac{6491}{100}=64.91$$

Answer8(b)
Sum of 100 0bservation = 50 X 100=5000
Correct sum = 5000-50+150=5100
Correct mean =

$$\frac{5100}{100}=51$$

Answer9(b)
Here ,

$$\bar{z}=\frac{(x1+x2+....+xn)+(y1+y2+y3+.....+yn)}{2n}$$

But $\bar{x}=\frac{x1+x2+\cdots...xn}{n}=(x1+x2+\cdots ... ...+xn)=n\bar{x}$

$$\bar{y}=\frac{y1+y2+\cdots ... yn}{n}=(y1+y2+\cdots ....+yn)=n\bar{y}$$

$$\therefore \bar{z}=\frac{n\bar{x}+n\bar{y}}{2n}=\frac{n(\bar{x}+\bar{y})}{2n}=\frac{(\bar{x}+\bar{y})}{2}$$

Answer10(b)

Given , $\bar{x}$ is the mean of x1, x2,x3,.....,xn then for a≠0 , the mean of ax1,ax2,ax3,.....axn,

$\frac{x1}{a}, \frac{x2}{a}, \ldots\ldots\ldots\ldots \frac{xn}{a}$

Required mean

$$\frac{(ax1+ax2+ax3+.....+axn)+(\frac{x1}{a}+\frac{x2}{a}+.....+\frac{xn}{a})}{2n}$$

$$\Rightarrow \frac{1}{2}\{\frac{a(x1+x2+...+xn)}{n}+\frac{\frac{1}{a}(x1+x2+.....+xn)}{n}\}$$

$$\Rightarrow \frac{1}{2}\{ax+\frac{1}{a}x\}=(a+\frac{1}{a})\frac{x}{2}$$

Answer11(c)

Sum of the terms = $\bar{x}1n1+\bar{x}2n2+.....+\bar{x}nxn$

Numbers of terms = n1+n2+..... +n = n^2

Therefore required mean =

$$\frac{\sum_{i=1}^{n} nixi}{\sum_{i=1}^{n} ni}$$

$$=\frac{\sum_{i=1}^{n} nixi}{n^2}$$

Answer12(c)

Mean = 8

$$mean = \frac{\sum fi \times xi}{\sum fi}$$

$$8 = \frac{(3x6)+(5x8)+(7x15)+9p+(11x8)+(13x4)}{(6+8+15+p+8+4)}$$

$$8 = \frac{18+40+105+9p+88+52}{41+p}$$

$$8 = \frac{303+9p}{41+p}$$

$$\Rightarrow 303 + 9p = 328 + 8p$$

$$\Rightarrow 9p - 8p = 328 - 303$$

$$\Rightarrow p = 25$$

Answer13(b)
Arrange the series in ascending order
0,13,15,20,27,29,31,34,43,50

N= 11
The median score = the value of (11+1/2)
The value of 6th = 29

Answer14(c)
Arrange the series in ascending order
31,35,36,38,40,44,45,52,55,60
N=10
There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5th and 6th =

$$\frac{1}{2}(40+44)$$
$$=\frac{1}{2}(84)$$
$$=42kg$$

Answer15(c)
Arrange in the ascending order
3,4,4,5,6,7,7,7,12
N= 9
The median score = the value of (9+1/2)
The value of 5th = 6

Answer16(c)
Arrange the numbers in ascending order
22,34,39,45,,54,54,56,68,78,84

N= 10

There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5^{th} and 6^{th} =

$$\frac{1}{2}(54+54)$$
$$=54$$

Answer17(b)
Most occurring number in the series is 15

Answer18(b)
Given median = 24
N= 10
There median score =1/2{ value of (10/2)th + value of (10+1/2)th}
The value of 5^{th} and 6^{th} =

$$24=\frac{1}{2}\{(x+2)+(x+4)\}$$
$$48=2x+6$$
$$2x=48-6=42$$
$$x=\frac{42}{2}=21$$