13. Statistics

Questions Pg-221

1. Question

The weight of 6 players in a volley ball team are all different and the average weight is 60 kilograms.

i) Prove that the team has at least one player weighing more than 60 kilograms.

ii) Prove that the team has at least one player weighing less than 60 kilograms.

Answer

(i) Given: number of players = 6

Their average weight = 60Kg

If all the players will have weight more than 60 then average weight will be more than 60. Hence, to have average weight to be 60 atleast one of the player must have his weight less than 60.

(ii) Given: number of players = 6

Their average weight = 60Kg

If all the players will have weight less than 60 then average weight will be less than 60. Hence, to have average weight to be 60 atleast one of the player must have his weight more than 60.

2. Question

Find two sets of 6 numbers with average 60, satisfying each of the conditions below:

i) 4 of the numbers are less than 60 and 2 of them greater than 60.

ii) 4 of the numbers are greater than 60 and 2 of them less than 60.

Answer

(i) Given: 6 numbers and their average is 60.

As the given average is 60 and numbers = 6

Hence, the sum of numbers must be = 60 × 6 = 360

So, Set having 4 of the numbers are less than 60 and 2 of them greater than 60 = {56, 57, 58, 59, 62, 68}

Average =(56+57+58+59+62+68)/6

= 360/6

= 60

Which is true as per given condition.

Hence, the required set is {56, 57, 58, 59, 62, 68}.

(ii) Given: 6 numbers and their average is 60.

As the given average is 60 and numbers = 6

Hence, the sum of numbers must be = 60 × 6 = 360

Set having 4 of the numbers are greater than 60 and 2 of them less than 60 = {61, 62, 63, 64, 58, 52}

Average =(61+62+63+64+58+52)/6

= 360/6

= 60

Which is true as per given condition.

Hence, the required set is {61, 62, 63, 64, 58, 52}.

3. Question

The table shows the children in a class, sorted according to the marks they got for a math test.

Marks	Children
2	1
3	2
4	5
5	4
6	6
7	11
8	10
9	4
10	2

Calculate the average marks of the class.

Answer

Marks	Children	Total marks
2	1	2
3	2	6
4	5	20
5	4	20
6	6	36
7	11	77
8	10	80
9	4	36
10	2	20
total	45	297

Average marks = Total marks/ total number of students

$$\text{Average} = \frac{297}{45} = 6.6$$

Average marks obtained by each student = 6.6

4. Question

The table below shows the days in a month sorted according to the amount of rainfall in a locality.

Rainfall (mm)	Days
54	3
56	5
58	6
55	3
50	2
47	4
44	5
41	2

What is the average rainfall per day during this month?

Answer

Rainfall (mm)	Days	Total rainfall
54	3	162
56	5	280
58	6	348
55	3	165
50	2	100
47	4	188
44	5	220
41	2	82
Total	30	1545

Average Rainfall = Total rainfall/ total number of days

$$\text{Average} = \frac{1545}{30} = 51.5$$

Average rainfall each day = 51.5cm

5. Question

The details of rubber sheets a farmer got during a month are given below.

Rubber (Kg)	Days
9	3
10	4
11	3
12	3
13	5
14	6
16	6

i) How many kilograms of rubber did he get a day on average in this month?

ii) The price of rubber is 120 rupees per kilogram. What is his average income per day this month from selling rubber?

Answer

(i)

Rubber (Kg)	Days	Total rubber
9	3	27
10	4	40
11	3	33
12	3	36
13	5	65
14	6	84
16	6	96
Total	30	381

Average Rubber each day = Total rubber/ total number of days

$$\text{Average} = \frac{381}{30} = 12.7$$

Average Rubber each day = 12.7Kg

(ii) Price of rubber per kilogram = 120 rupees

Price of Average Rubber of 12.7Kg = 12.7 × 120

= 1524 rupees

Questions Pg-225

1 A. Question

Find different sets of 6 different numbers between 10 and 30 with each number given below as mean:

20

Answer

Given: 6 numbers and their average is 20 between 10 and 30.

As the given average is 20 and numbers = 6

Hence, the sum of numbers must be = 20 × 6 = 120

So, Set having different numbers between 10 and 30 = {12, 13, 15, 25, 27, 28}

Average =(12+13+15+25+27+28)/6

= 120/6

= 20

Which is true as per given condition.

Hence, the required set is {12, 13, 15, 25, 27, 28}.

1 B. Question

Find different sets of 6 different numbers between 10 and 30 with each number given below as mean:

15

Answer

Given: 6 numbers and their average is 15 between 10 and 30.

As the given average is 15 and numbers = 6

Hence, the sum of numbers must be = 15 × 6 = 90

So, Set having different numbers between 10 and 30 = {11, 12, 13, 14, 15, 25}

Average =(11+12+13+14+15+25)/6

= 90/6

= 15

Which is true as per given condition.

Hence, the required set is {11, 12, 13, 14, 15, 25}.

1 C. Question

Find different sets of 6 different numbers between 10 and 30 with each number given below as mean:

25

Answer

Given: 6 numbers and their average is 25 between 10 and 30.

As the given average is 25 and numbers = 6

Hence, the sum of numbers must be = 25 × 6 = 150

So, Set having different numbers between 10 and 30 = {22, 23, 24, 26, 27, 28}

Average =(22+23+24+26+27+28)/6

= 150/6

= 25

Which is true as per given condition.

Hence, the required set is {22, 23, 24, 26, 27, 28}.

2. Question

The table below shows the children in a class, sorted according to their heights.

Height (cm)	Number of children
148 – 152	8
152 – 156	10
156 – 160	15
160 – 164	10
164 – 168	7

What is the mean height of a child in this class?

Answer

Height (cm)	Number of children	Mid value of height	Total height
148 – 152	8	150	1200
152 – 156	10	154	1540
156 – 160	15	158	2370
160 – 164	10	162	1620
164 – 168	7	166	1162
Total	50		7892

Mean height of child = Total height/ total number of children

$$\text{Average} = \frac{7892}{50} = 157.84$$

Mean height of a child in this class = 157.84

3. Question

The teachers in a university are sorted according to their ages, as shown below.

Age	Number of Persons
25-30	6
30-35	14
35-40	16
40-45	22
45-50	5
50-55	4
55-60	3

What is the mean age of a teacher in this university?

Answer

Age	Number of Persons	Mid value	Total age
25-30	6	27.5	165
30-35	14	32.5	455
35-40	16	37.5	600
40-45	22	42.5	935
45-50	5	47.5	237.5
50-55	4	52.5	210
55-60	3	57.5	172.5
Total	70		2775

Mean age of child = Total age/ total number of children

$$\text{Average} = \frac{2775}{70} = 39.64$$

Mean age of a child in this class = 39.64

4. Question

The table below shows children in a class sorted according to their weights.

Weight (kg)	Number of children
21-23	4
23-25	
25-27	7
27-29	6
29-31	3
31-33	1

The mean weight is calculated as 26 kilograms. How many children have weights between 23 and 25 kilograms?

Answer

Given: mean weight = 26 Kg

Let the unknown weight is x.

Weight (kg)	Number of children	Mid value	Total weight
21-23	4	22	88
23-25	x	24	24x
25-27	7	26	182
27-29	6	28	168
29-31	3	30	90
31-33	1	32	32
Total	21+x		560 + 24x

Mean age of child = Total age/ total number of children

$$\text{Average} = \frac{560 + 24x}{21 + x} = 26$$

⇒ 560 + 24x = 26(21 + x)

⇒ 560 + 24x = 546 + 26x

⇒ 560 - 546 = 26x – 24x

⇒ 14 = 2x

⇒ x = 7

children have weights between 23 and 25 kilograms = 7

Total number of questions = 12

How much each question will cost?