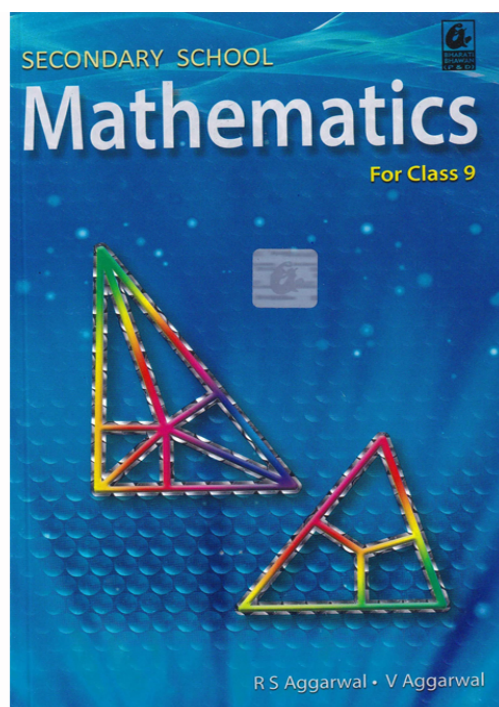


RS Aggarwal Solutions for Class 9

Maths Chapter 14–Statistics

Class 9 - Chapter 14 Statistics



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RS Aggarwal Solutions for Class 9 Maths Chapter 14–Statistics

Class 9: Maths Chapter 14 solutions. Complete Class 9 Maths Chapter 14 Notes.

RS Aggarwal Solutions for Class 9 Maths Chapter 14–Statistics

RS Aggarwal 9th Maths Chapter 14, Class 9 Maths Chapter 14 solutions

Ex 14A

Question 1.

Solution:

Statistics is a science which deals with the collection, presentation, analysis and interpretations of numerical data.

Question 2.

Solution:

- (i) Numerical facts alone constitute data
- (ii) Qualitative characteristics like intelligence, poverty etc. which cannot be measured, numerically, don't form data.
- (iii) Data are an aggregate of facts. A single observation does not form data.
- (iv) Data collected for a definite purpose may not be suited for another purpose.
- (v) Data is different experiments are comparable.

Question 3.

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Solution:

(i) Primary data : The data collected by the investigator himself with a definite plan in mind are called primary data.

(ii) Secondary data : The data collected by some one other than the investigator are called secondary data. The primary data is more reliable and relevant.

Question 4.**Solution:**

(i) Variate : Any character which is capable of taking several different values is called a variate or variable.

(ii) Class interval : Each group into which the raw data is condensed, is called a class interval

(iii) Class size : The difference between the true upper limit and the true lower limit of a class is called class size.

(iv) Class Mark : $\frac{\text{upper limit} + \text{lower limit}}{2}$ is called a class mark

(v) Class limits : Each class is bounded by two figures which are called class limits which are lower class limit and upper class limit.

(vi) True class limits : In exclusive form, the upper and lower limits of a class are respectively are the true upper limit and true lower limit but in inclusive form, the true lower limit of a class is obtained by subtracting 0.5 from lower limit of the class and for true limit, adding 0.5 to the upper limit.

(vii) Frequency of a class : The number of times an observation occurs in a class is called its frequency.

(viii) Cumulative frequency of a class : The cumulative frequency corresponding to a class is the sum of all frequencies upto and including that class.

Question 5.**Solution:**

The given data can be represent in form of frequency table as given below:

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Class	Tally marks	(No. of families frequency)
0-2	II II I	11
2-4	II II II II	17
4-6	II III	9
6-8	III	3
Total.		40

Question 6.

Solution:

The frequency distribution table of the given data is given below :

Class (marks)	Tally marks	No. of students (frequency)
0-5	II I	6
5-10	II II	10
10-15	II III	8
15-20	II III	8
20-25	II III	8
Total		40

Question 7.

Solution:

The frequency distribution table of the

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Age (in years class)	Tally marks	No. of students (frequency)
6-9		5
9-12		4
12-15		4
15-18		7
18-21		3
21-24		7
Total		30

Question 8.

Solution:

The frequency table is given below :

Monthly wages (in Rs.) (class)	Tally marks	No. of Labourers (frequency)
210-230		4
230-250		4
250-270		5
270-290		3
290-310		7
310-330		5
Total		28

Question 9.

Solution:

The frequency table of given data is given below :

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Weight (in gm)	Tally marks	No. of ranges (frequency)
30–40		4
40–50		6
50–60		3
60–70		5
70–80		9
80–90		6
90–100		2
100–110		3
110–120		2
Total		40

Question 10.

Solution:

The frequency distribution table of the given data is given below :

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Weekly wages (in rupees)	Tally marks	No. of workers (frequency)
800–810		3
810–820		2
820–830		1
830–840		8
840–850		5
850–860		1
860–870		3
870–880		1
880–890		1
890–900		5
Total		30

Question 11.

Solution:

The frequency table of the given data:

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Amount of bill (in rupees)	Tally marks	No. of houses (frequency)
50–60		2
60–70		6
70–80		3
80–90		8
90–100		5
100–110		7
110–120		4
120–130		4
130–140		1
Total		40

Question 12.

Solution:

The cumulative frequency of the given table is given below:

Age (in years)	Number of patients frequency	Cumulative frequency
10–20	90	90
20–30	50	140
30–40	60	200
40–50	80	280
50–60	50	330
60–70	30	360

Question 13.

Solution:

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The given table can be represented in a group frequency table in given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	5	$12 - 5 = 7$	$32 - 12 = 20$	$40 - 32 = 8$	$45 - 40 = 5$	$48 - 45 = 3$

Question 14.

Solution:

Frequency table of the given cumulative frequency is given below :

Marks	No. of students (c.f.)	frequency
0-10	17	17
10-20	22	$22 - 17 = 5$
20-30	29	$29 - 22 = 7$
30-40	37	$37 - 29 = 8$
40-50	50	$50 - 37 = 13$
50-60	60	$60 - 50 = 10$

Question 15.

Solution:

A frequency table of the given cumulative frequency table is given below :

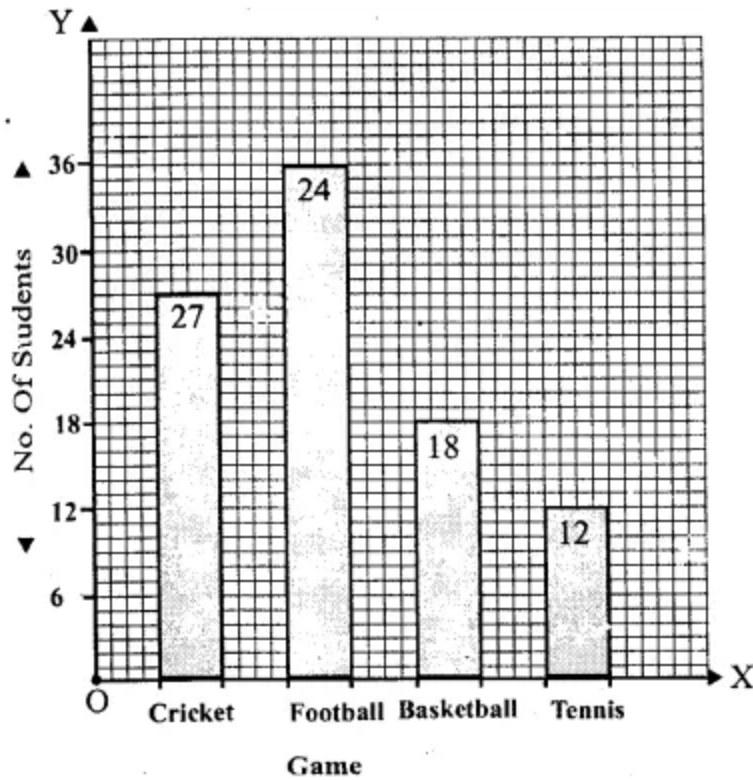
Marks obtained	No. of students (f)
0–10	$100 - 92 = 8$
10–20	$92 - 87 = 5$
20–30	$87 - 75 = 12$
30–40	$75 - 40 = 35$
40–50	$40 - 16 = 24$
50–60	$16 - 0 = 16$

Ex 14B

Question 1.

Solution:

We shall take the marks along x-axis and number of students along y-axis.

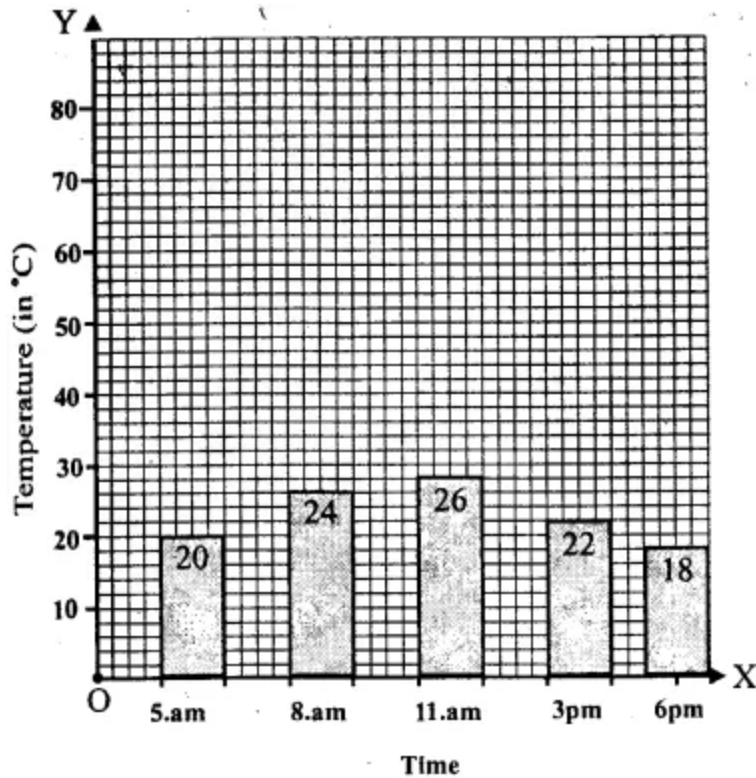


Question 2.

Solution:

We shall take the time on x-axis and temperature (in °C) on y-axis.

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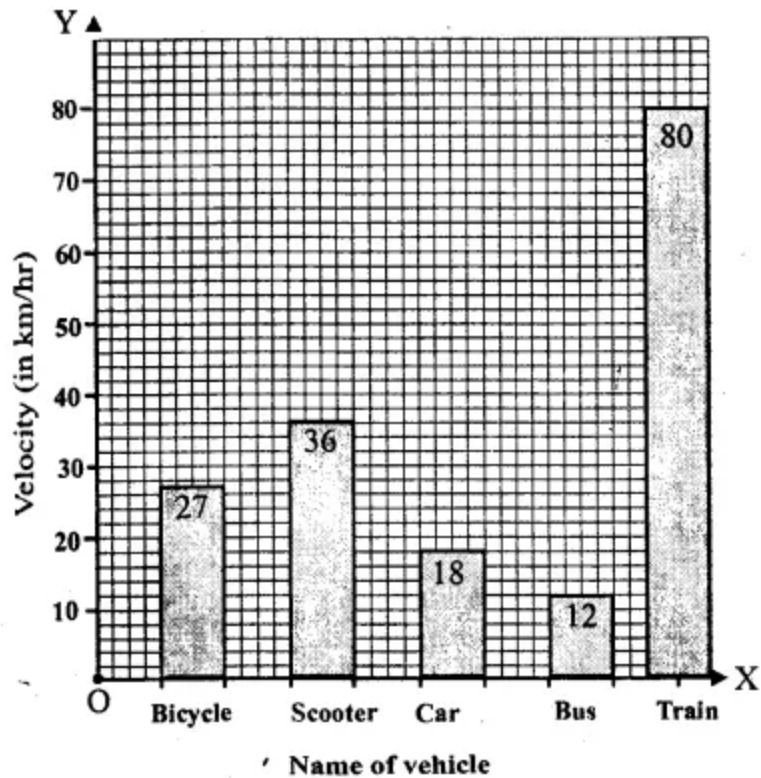


Question 3.

Solution:

We shall take name of vehicle on x-axis and velocity (in km/hr) on y-axis

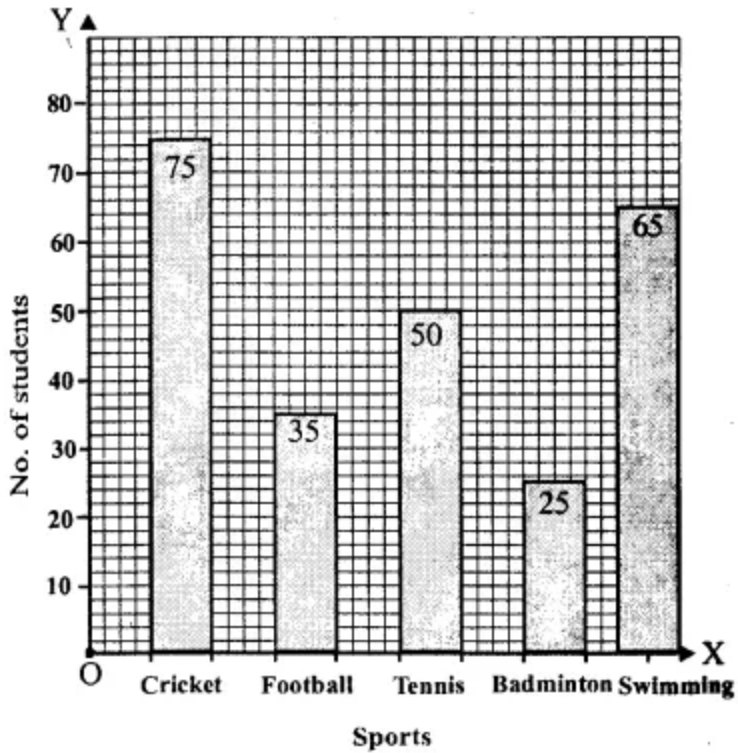
<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>



Question 4.

Solution:

We shall take sports on x-axis and number of students on y-axis.

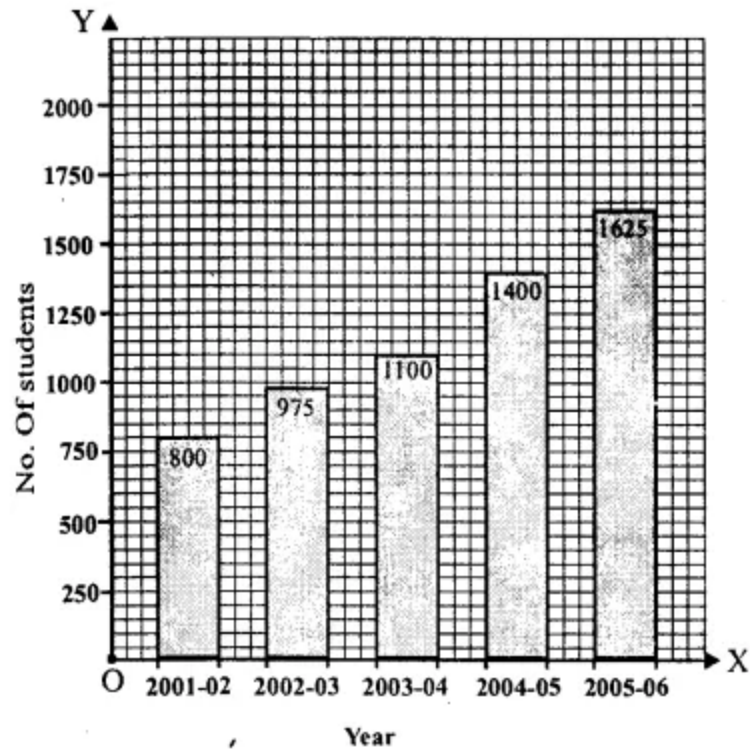


Question 5.

Solution:

We shall take years on x-axis and number of students on y-axis.

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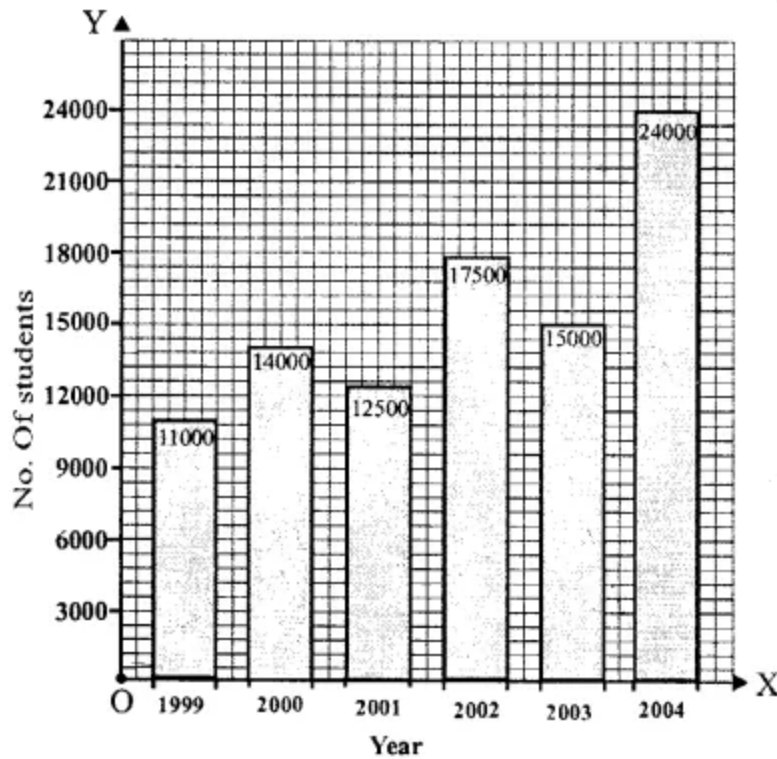


Question 6.

Solution:

We shall take years on x-axis and number of students on y-axis.

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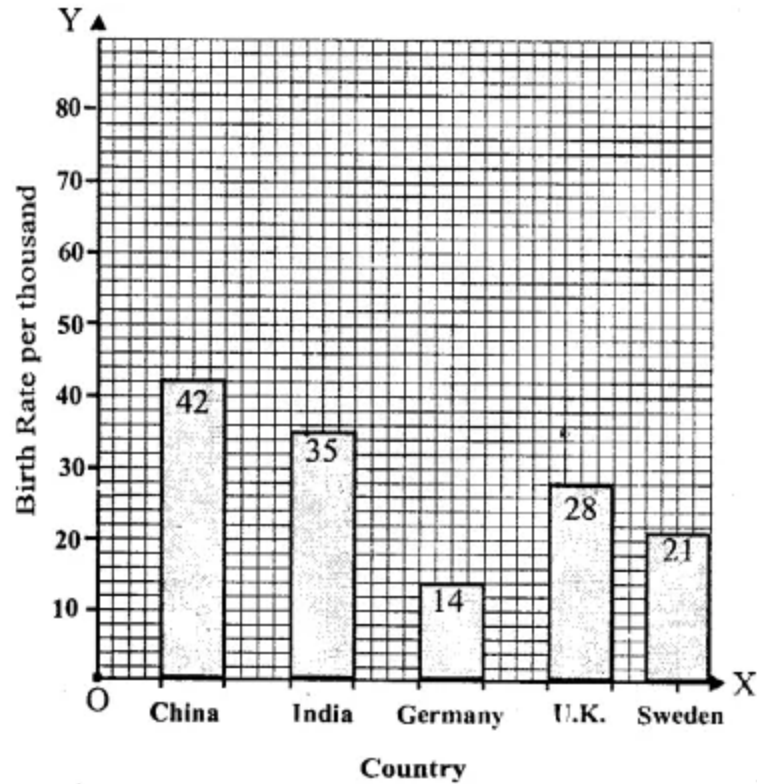


Question 7.

Solution:

We shall take years on x-axis and number of students on y-axis.

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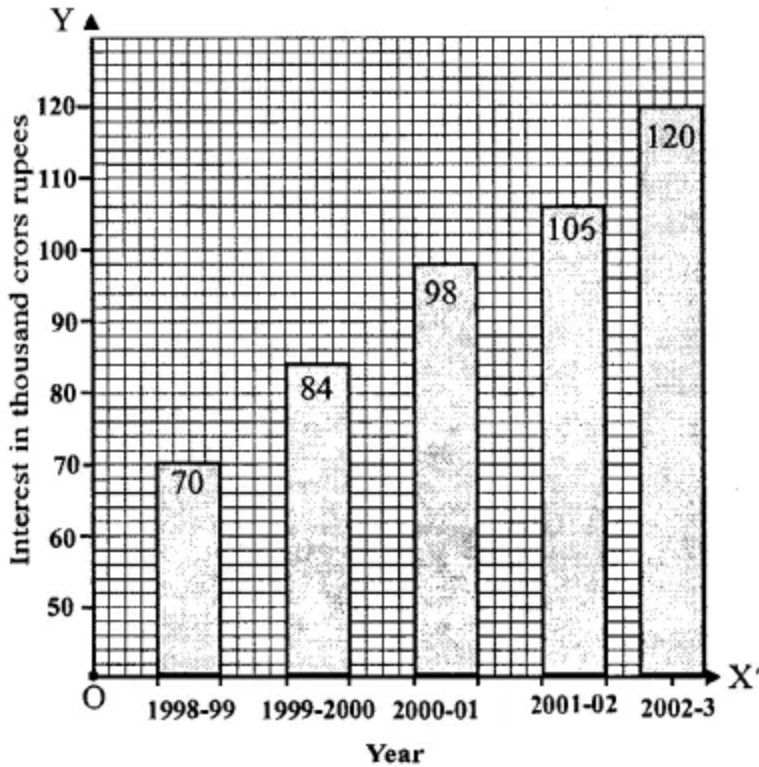


Question 8.

Solution:

We shall take years on x-axis and number of students on y-axis.

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

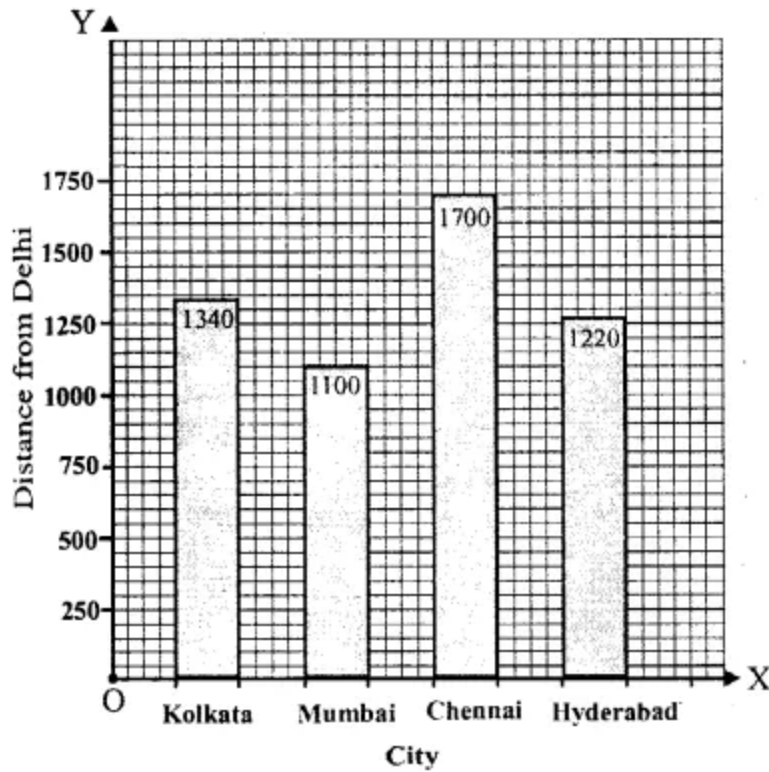


Question 9.

Solution:

We shall take years on x-axis and number of students on y-axis.

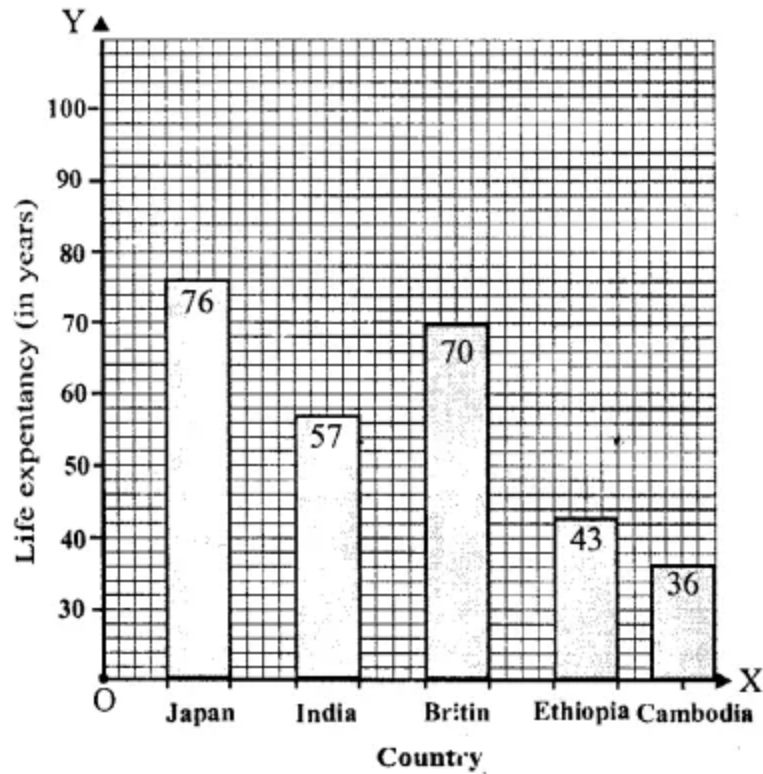
<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>



Question 10.

Solution:

We shall take years on x-axis and number of students on y-axis.

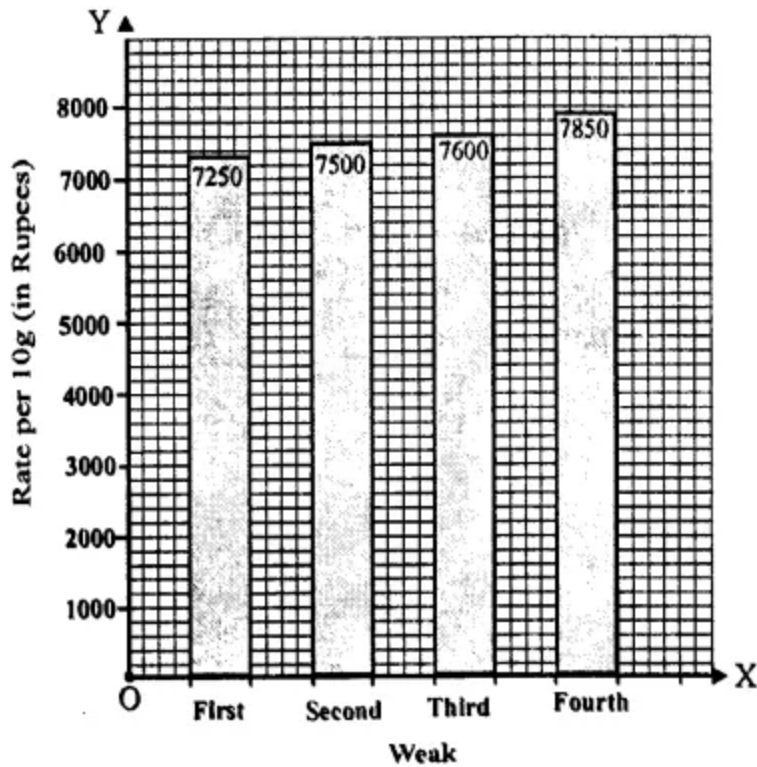


Question 11.

Solution:

We shall take week on x-axis and Rate per 10g (in Rs.) on y-axis.

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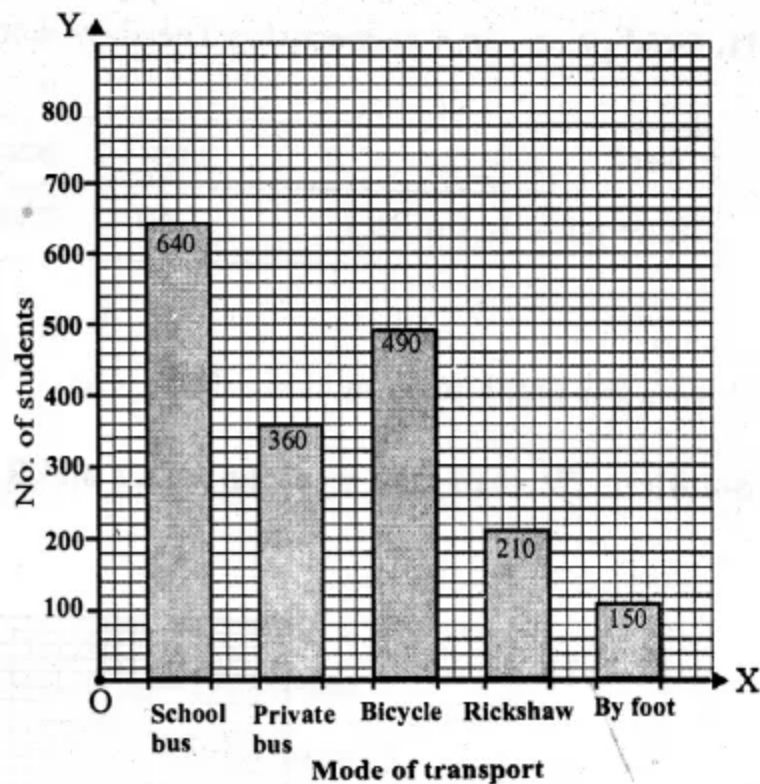


Question 12.

Solution:

We shall take mode of transport on x-axis and number of students on y-axis.

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Question 13.

Solution:

We see from the graph that

(i) It shows the marks obtained by a student in various subjects.

(ii) The student is very well in mathematics.

(iii) The student is very poor, in Hindi.

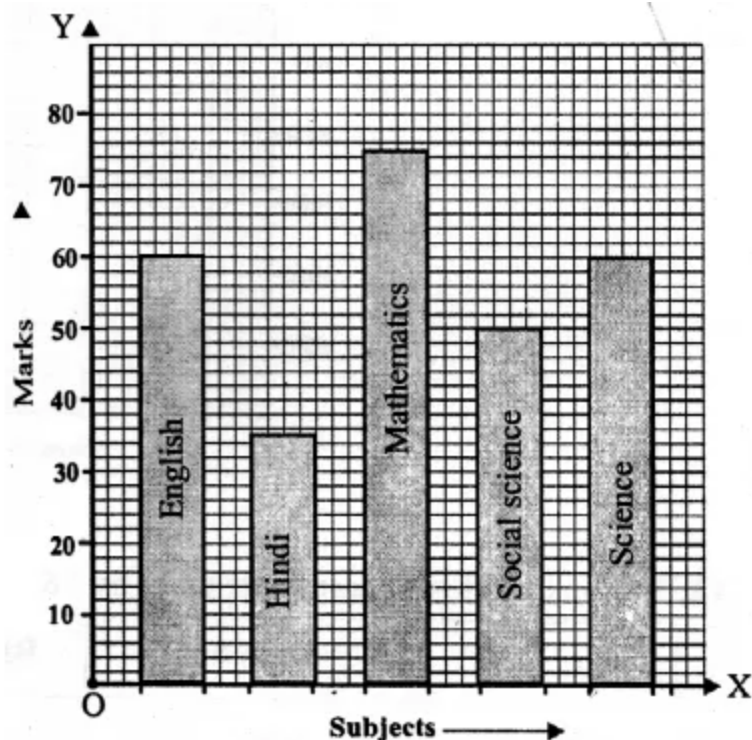
(iv) Average marks

$$= 60+35+75+50+605 \text{ (Here } x = 5\text{)}$$

$$= 2805$$

$$= 56 \text{ marks}$$

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Bar graph showing the marks obtained by a student in an examination.

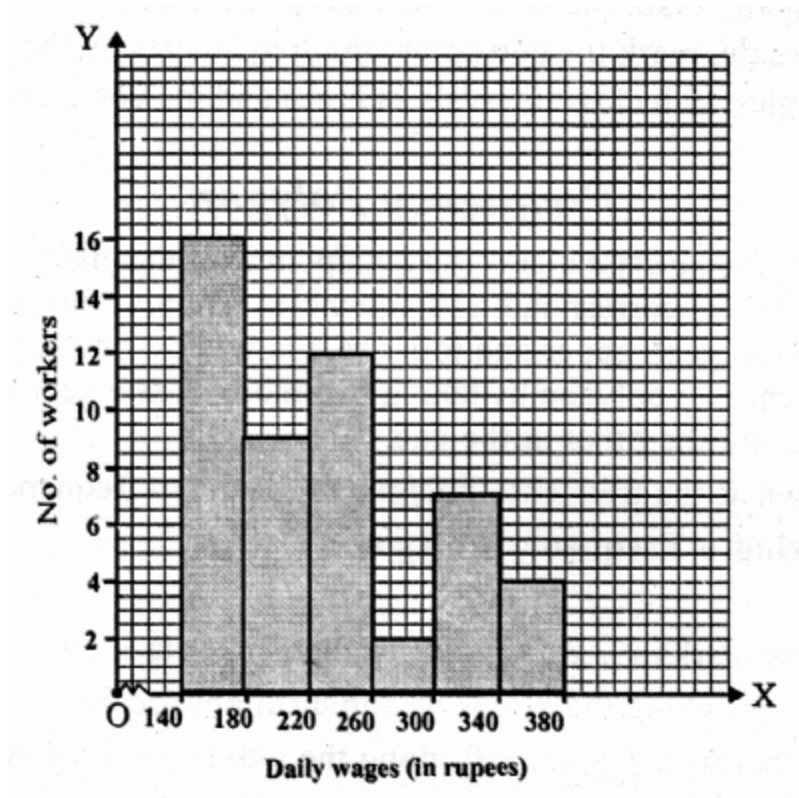
Ex 14C

Question 1.

Solution:

It is clear that the given frequency distribution is in exclusive form, we represent the daily wages (in rupees) along x-axis and no. of workers along y-axis. Then we construct rectangles with class intervals as bases and corresponding frequencies as heights as shown given below:

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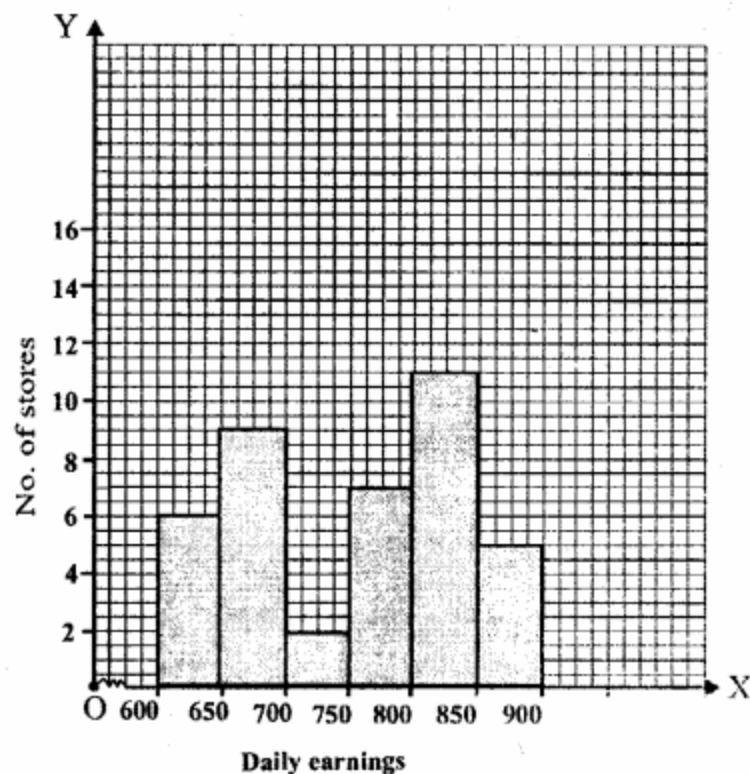


Question 2.

Solution:

We shall take daily earnings along x-axis and number of stores along y-axis. Then we construct rectangles with the given class intervals as bases and corresponding frequency as height as shown in the graph.

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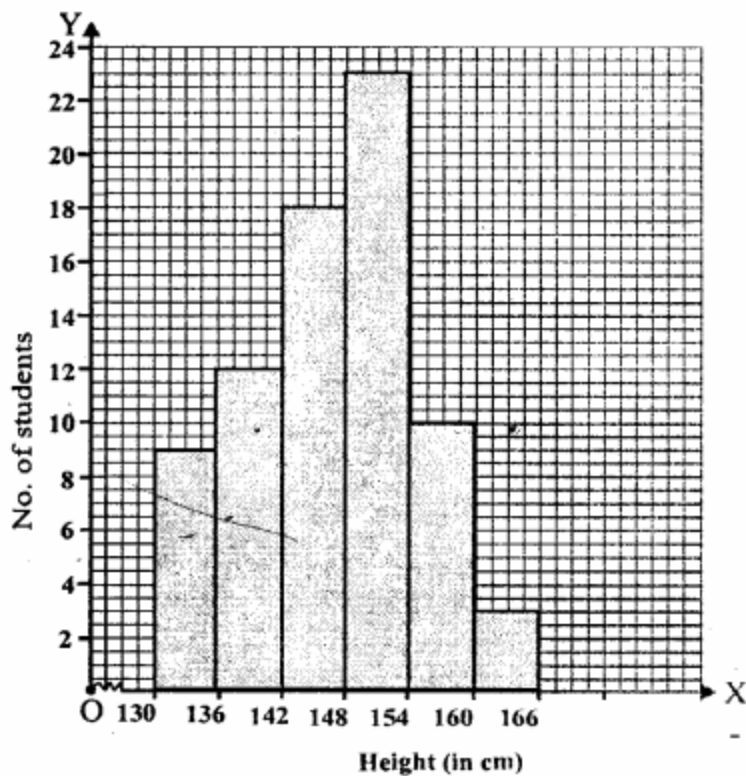


Question 3.

Solution:

We shall take heights along x-axis and number of students along y-axis. Then we shall complete the rectangles with the given class intervals as bases and frequency as height and complete the histogram as shown below :

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

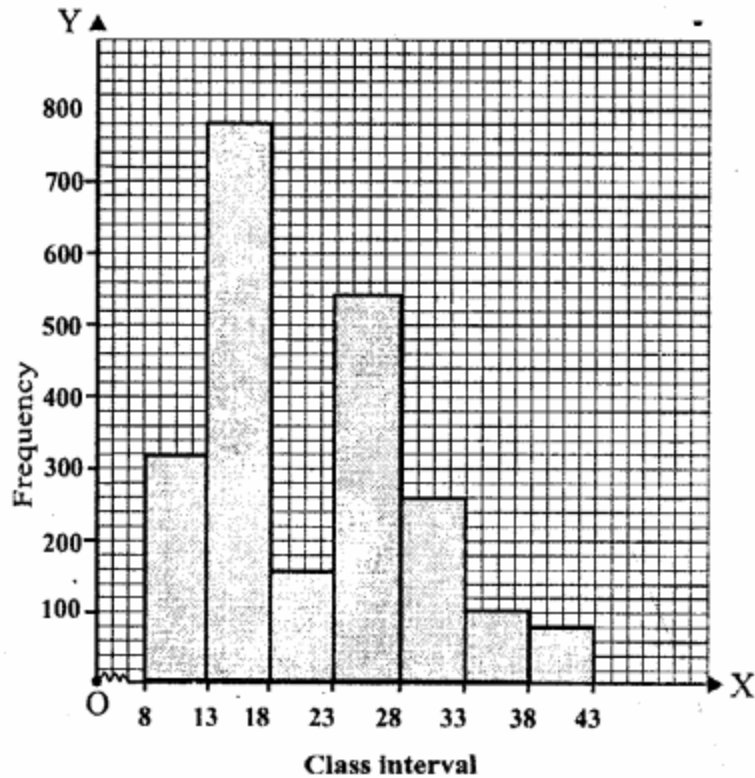


Question 4.

Solution:

We shall take class intervals along x-axis and frequency along y-axis. Then we shall complete the rectangles with given class interval as bases and frequency as heights and complete the histogram as shown below.

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

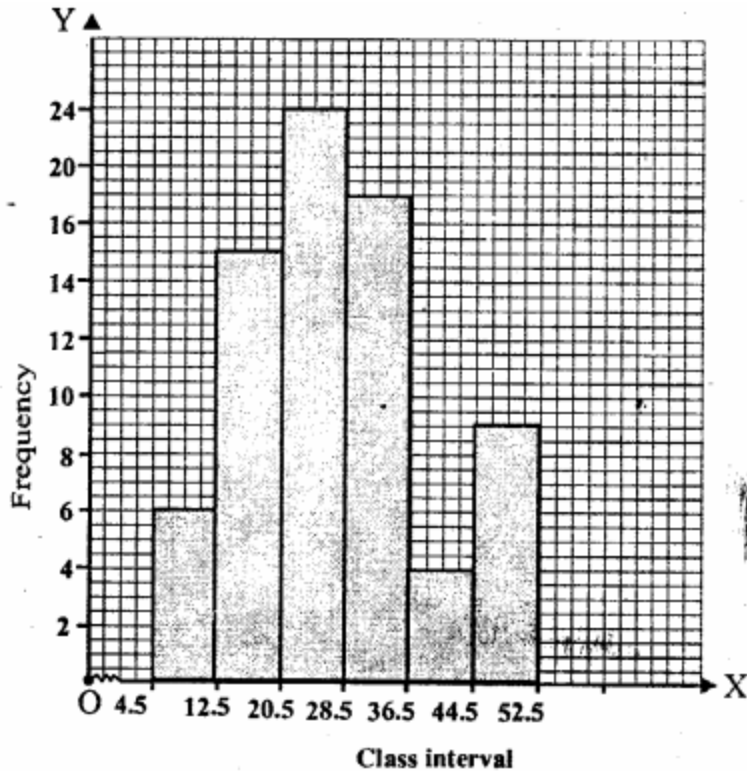


Question 5.

Solution:

The given frequency distribution is in inclusive form first we convert it into exclusive form at given below.

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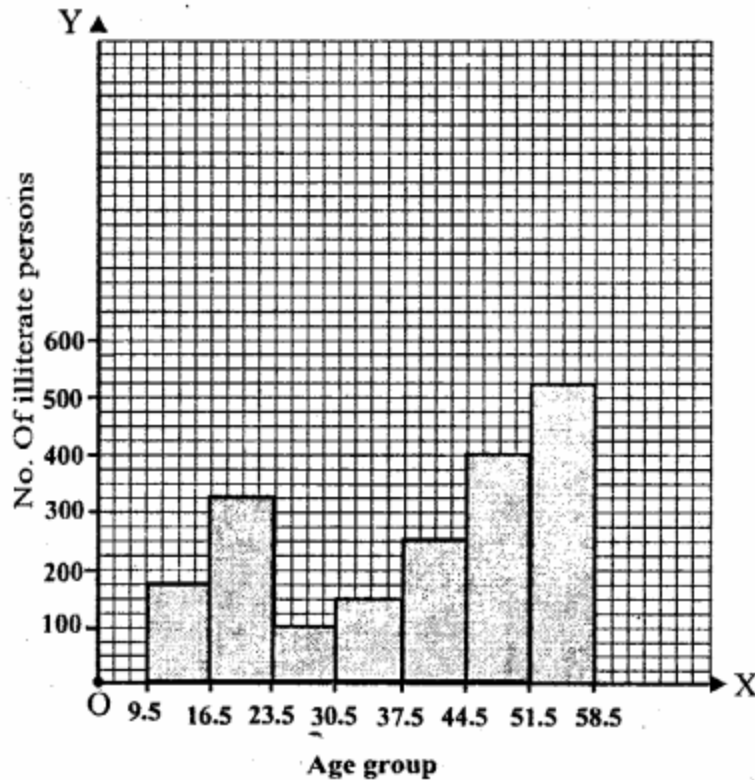
Class interval	4.5–12.5	12.5–20.5	20.5–28.5	28.5–36.5	36.5–44.5	44.5–52.5
Frequency	6	15	24	18	4	9

Now, we shall take class intervals along x-axis and frequency along y-axis and draw rectangles with class intervals as bases and frequency as heights and complete the histogram as shown.

Question 6.

Solution:

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Question 7.

Solution:

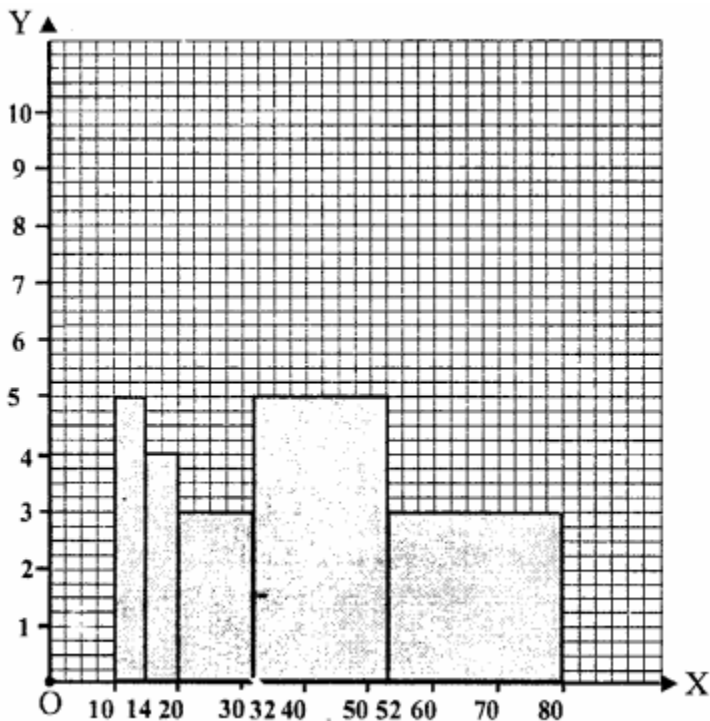
In the given distribution class intervals are different size. So, we shall calculate the adjusted frequency for each class. Here minimum class size is 4. We know that adjusted

frequency of the class is $\frac{\text{max class size}}{\text{class size of this class}} \times \text{its frequency}$

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Therefore

Class interval	Frequency	Adjusted frequency.
10–14	5	$\frac{4}{4} \times 5 = 5$
14–20	6	$\frac{4}{6} \times 6 = 4$
20–32	9	$\frac{4}{12} \times 9 = 3$
32–52	25	$\frac{4}{20} \times 25 = 5$
52–80	21	$\frac{4}{28} \times 21 = 3$



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Question 8.**Solution:**

We shall take two imagined classes one 0-10 at the beginning with zero frequency and other 70-80 at the end with zero frequency.

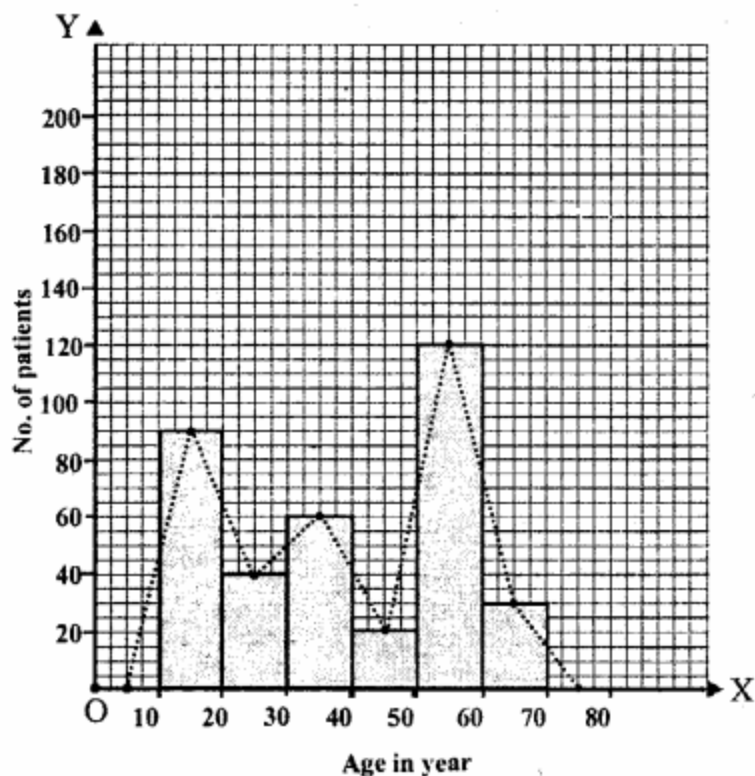
Age in year		
Class intervals	Class Mark	Frequency
0-10	5	0
10-20	15	2
20-30	25	5
30-40	35	12
40-50	45	19
50-60	55	9
60-70	65	4
70-80	75	0

Now, plot the points (5, 0), (15, 2), (25, 5), (35, 12), (45, 19), (55, 9), (65, 4), (75, 0) on the graph and join them in order to get a polygon as shown below.

Question 9.**Solution:**

We take Age (in years) along x-axis and number of patients along y-axis. First we complete the histogram and then join the midpoints of their tops in order

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We also take two imagined classes. One 0-10 at the beginning and other 70-80 at the end and also join their midpoints to complete the polygon as shown.

Question 10.

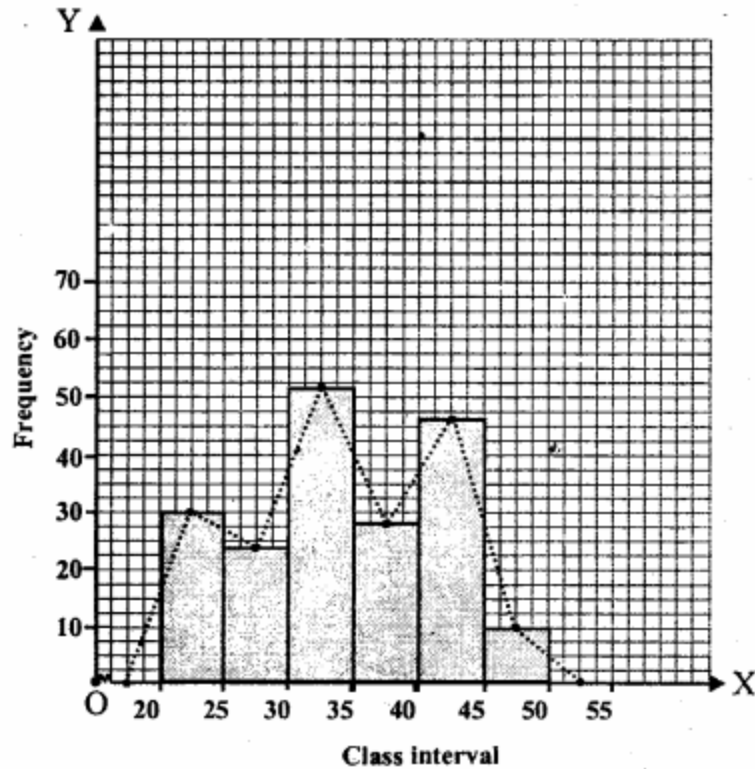
Solution:

We take class intervals along x-axis and frequency along y-axis.

First we complete the histogram and then join the midpoints of the tops of adjacent rectangles in order. We shall take two imagined classes 15-20 at the beginning and 50-55 at the end.

We also join their midpoints to complete the polygon as shown

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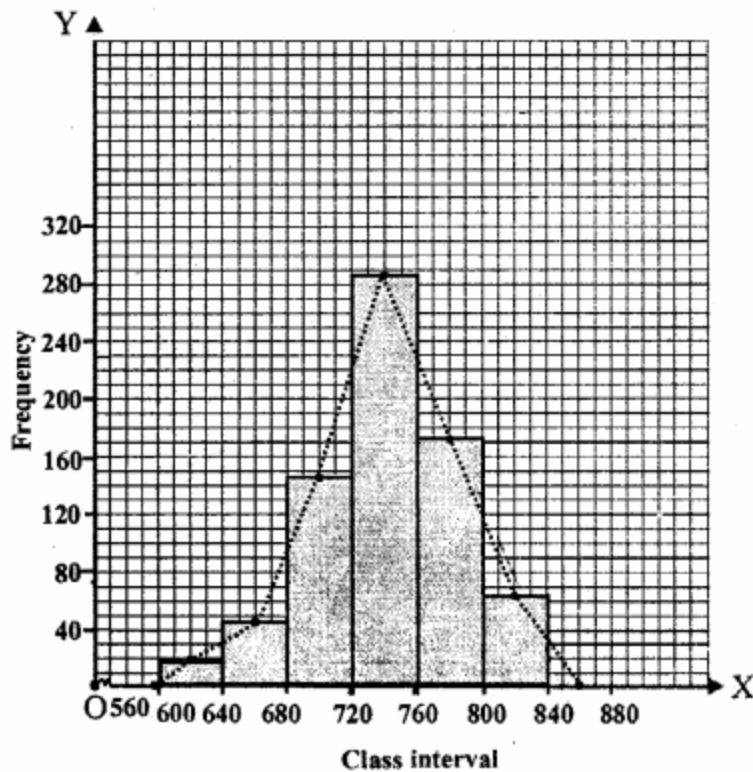


Question 11.

Solution:

We represent class interval on x-axis and frequency on y-axis. First we construct the histogram and then join the midpoints of the tops of each rectangle by line segments. We shall take two imagined class i.e. 560-600 at the beginning and 840-900 at the end. Join their midpoints also to complete

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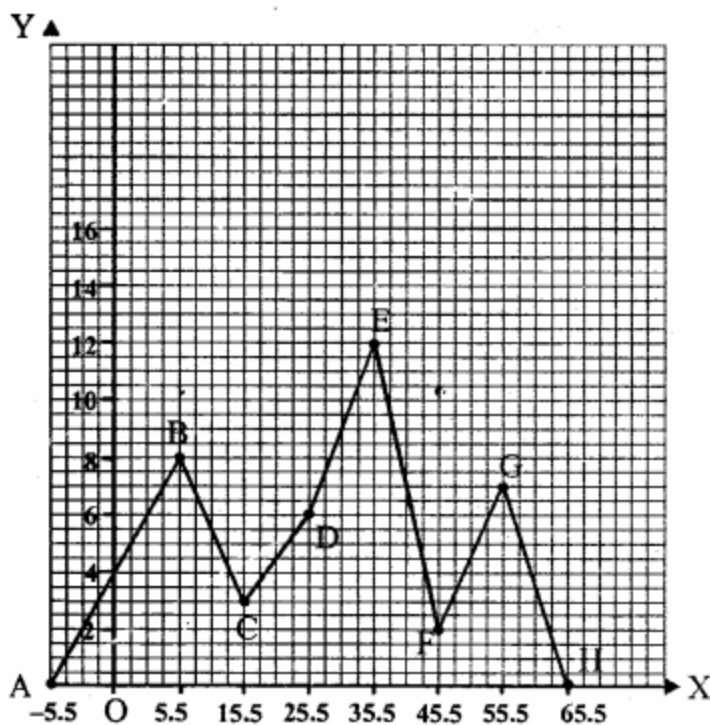


Question 12.

Solution:

We will take the imagined class 11-0 at the beginning and 61-70 at the end. Each with frequency zero. Thus, we have,

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Class intervals	Class mark	frequency
-1-0	-5.5	0
1-10	5.5	8
11-20	15.5	3
21-30	25.5	6
31-40	35.5	12
41-50	45.5	2
51-60	55.5	7
61-70	65.5	0

Now we will mark the points A (-5.5, 0), B(5.5, 8), C(15.5, 3) D(25.5, 6), E(35.5, 12), F(45.5, 2), G(55.5, 7) and H(65.5, 0) on the graph and join them in order to get the required frequency polygon.

Ex 14D

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Question 1.**Solution:**

(i) First eight natural numbers are 1, 2, 3, 4, 5, 6, 7, 8

$$\therefore \text{Mean} = \frac{1+2+3+4+5+6+7+8}{8} = \frac{36}{8} = 4.5$$

(ii) First ten odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

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

(iii) First five prime numbers are 2, 3, 5, 7, 11.

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

(iv) First six even numbers are 2, 4, 6, 8, 10, 12

$$\therefore \text{Mean} = \frac{2+4+6+8+10+12}{6} = \frac{42}{6} = 7$$

(v) First seven multiples of 5 are 5, 10, 15, 20, 25, 30, 35

$$\therefore \text{Mean} = \frac{5+10+15+20+25+30+35}{7} = \frac{140}{7} = 20$$

(vi) All the factors of 20 are, 1, 2, 4, 5, 10, 20

$$\therefore \text{Mean} = \frac{1+2+4+5+10+20}{6} = \frac{42}{6} = 7$$

Question 2.**Solution:**

No. of families (n) = 10

Sum of children ($\sum x_1$) = 2 + 4 + 3 + 4 + 2 + 0 + 3 + 5 + 1 + 6 = 30

$$\therefore \text{Mean } (\bar{x}) = \frac{\sum x_1}{n} = \frac{30}{10} = 3$$

Question 3.**Solution:**

Here number of days (n) = 7

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Number of books ($\sum x_1$) = $105 + 216 + 322 + 167 + 273 + 405 + 346 = 1834$

$\therefore$ Mean ($\bar{x}$) = $\frac{\sum x_1}{n} = \frac{1834}{7} = 262$ books

Question 4.

Solution:

Number of days (n) = 6

Sum of temperature ($\sum x$) = $35.5 + 30.8 + 27.3 + 32.1 + 23.8 + 29.9 = 179.4^\circ\text{F}$

$\therefore$ Mean temperature = $\frac{\sum x}{n} = \frac{179.4}{6} = 29.9^\circ\text{F}$

Question 5.

Solution:

Number of students (n) = 12

Sum of marks ($\sum x$) = $64 + 36 + 47 + 23 + 0 + 19 + 81 + 93 + 72 + 35 + 3 + 1 = 474$

$= \frac{\sum x_1}{n} = \frac{474}{12} = 39.5$

Question 6.

Solution:

Here, $n = 6$

and arithmetic mean = 13

Total sum = $13 \times 6 = 78$.

But sum of $7 + 9 + 11 + 13 + 21 = 61$

Value of $x = 78 - 61 = 17$

Hence $x = 17$ Ans.

Question 7.

Solution:

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Let $x_1, x_2, x_3, \dots, x_{24}$ be the 24 numbers

$$x_1 + x_2 + x_3 + \dots + x_{24} = 35$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_{24} = 35 \times 24$$

By adding 3 to each number, we get :

$$(x_1 + 3) + (x_2 + 3) + (x_3 + 3) \dots (x_{24} + 3) = (x_1 + x_2 + x_3 \dots x_{24}) + 3 \times 24$$
$$\therefore 840 + 72 = 912$$

$$\therefore \text{New mean} = \frac{912}{24} = 38 \text{ Ans.}$$

Question 8.

Solution:

Let $x_1 + x_2 + x_3 + \dots + x_{20}$ be the 20 numbers

$$\therefore \text{Mean of 20 numbers} = \frac{x_1 + x_2 + x_3 + \dots + x_{20}}{20}$$

$$\Rightarrow \frac{x_1 + x_2 + x_3 + \dots + x_{20}}{20} = 43$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_{20} = 43 \times 20 = 860 \quad \dots(i)$$

Now, New numbers are $(x_1 - 6), (x_2 - 6), (x_3 - 6), \dots, (x_{20} - 6)$

$$\therefore \text{Their mean} = \frac{(x_1 - 6) + (x_2 - 6) + (x_3 - 6) + \dots + (x_{20} - 6)}{20}$$

$$= \frac{x_1 + x_2 + x_3 + \dots + x_{20} - 6 \times 20}{20} = \frac{860 - 120}{20} = \frac{740}{20} = 37 \quad [\text{from (i)}]$$

$$\therefore \text{New mean} = 37 \text{ Ans.}$$

Question 9.

Solution:

Let $x_1, x_2, x_3 \dots x_{15}$ be the numbers

$$\text{Mean} = \frac{x_1 + x_2 + x_3 + \dots + x_{15}}{15} = 27$$

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$$\Rightarrow x_1 \times x_2 \times x_3 \dots x_{15} = 27 \times 15 = 405$$

Now, new number are

$$4x_1, 4x_2, 4x_3, \dots, 4x_{15}$$

$$\therefore \text{Their mean} = \frac{4x_1 + 4x_2 + 4x_3 + \dots + 4x_{15}}{15}$$

$$= \frac{4(x_1 + x_2 + x_3 + \dots + x_{15})}{15} = \frac{4 \times 405}{15} = 4 \times 27 = 108 \text{ Ans.}$$

Question 10.

Solution:

Let $x_1, x_2, x_3 \dots x_{12}$ be the numbers

$$\text{Mean} = \frac{x_1 + x_2 + x_3 + \dots + x_{12}}{12} = 40$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_{12} = 40 \times 12 = 480$$

Now, new numbers are $x_{18}, x_{28}, x_{38}, \dots, x_{128}$

$$\text{Mean} = \frac{x_{18} + x_{28} + x_{38} + \dots + x_{128}}{12}$$

$$= \frac{18(x_1 + x_2 + x_3 + \dots + x_{12})}{12}$$

$$= \frac{480 \times 18}{12} = 720$$

Mean of new numbers = 720

Question 11.

Solution:

Let $x_1, x_2, x_3, \dots, x_{20}$ are the numbers

$$\text{Mean} = \frac{x_1 + x_2 + x_3 + \dots + x_{20}}{20} = 18$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_{20} = 18 \times 20 = 360$$

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$$\begin{aligned}\therefore \text{Mean of new number} &= \frac{(x_1 + 3) + (x_2 + 3) + (x_3 + 3) + \dots + (x_{10} + 3) + x_{11} + x_{12} + \dots + x_{20}}{20} \\ &= \frac{x_1 + x_2 + x_3 + \dots + x_{20} + 3 \times 10}{20} = \frac{360 + 30}{20} = \frac{390}{20} = 19.5 \text{ Ans.}\end{aligned}$$

Question 12.**Solution:**

Mean weight of 6 boys = 48 kg

Their total weight = $48 \times 6 = 288$ kg

Weights of 5 boys among them, are 51 kg, 45 kg, 49 kg, 46 kg and 44 kg

Sum of weight of 5 boys = $(51 + 45 + 49 + 46 + 44)$ kg = 235 kg

Weight of 6th boy = $288 \text{ kg} - 235 \text{ kg} = 53 \text{ kg}$ Ans.

Question 13.**Solution:**

Mean of 50 students = 39

Total score = $39 \times 50 = 1950$

Now correct sum of scores = $1950 - \text{Wrong item} + \text{Correct item} = 1950 - 23 + 43$

$= 1950 + 20 = 1970$

Correct mean = $1970/50 = 39.4$ Ans.

Question 14.**Solution:**

Mean of 100 items = 64

The sum of 100 items = $64 \times 100 = 6400$

New sum of 100 items = $6400 + 36 + 90 - 26 - 9 = 6526 - 35 = 6491$,

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Correct mean = $6491100 \div 64.91 = 64.91$ Ans.

Question 15.

Solution:

Mean of 6 numbers = 23

Sum of 6 numbers = $23 \times 6 = 138$

Excluding one number, the mean of remaining 5 numbers = 20

Total of 5 numbers = $20 \times 5 = 100$

Excluded number = $138 - 100 = 38$ Ans.

Ex 14E

Question 1.

Solution:

Mean marks of 7 students = 226

$\therefore$ Total marks of 7 students = $226 \times 7 = 1582$

Marks obtained by 6 of them are 340, 180, 260, 56, 275 and 307

$\therefore$ Sum of marks of these 6 students = $340 + 180 + 260 + 56 + 275 + 307 = 1418$

$\therefore$ Marks obtained by seventh student = $1582 - 1418 = 164$ Ans.

Question 2.

Solution:

Mean weight of 34 students = 46.5 kg.

$\therefore$ Total weight of 34 students = $46.5 \times 34 \text{ kg} = 1581 \text{ kg}$

By including the weight of teacher, the mean weight of 35 persons = $500 \text{ g} + 46.5 \text{ kg}$

= $46.5 + 0.5 = 47.0 \text{ kg}$

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$$\therefore \text{Total weight} = 47.0 \times 35 = 1645 \text{ kg}$$

$$\therefore \text{Weight of the teacher} = (1645 - 1581) \text{ kg} = 64 \text{ kg Ans}$$

Question 3.**Solution:**

$$\text{Mean weight of 36 students} = 41 \text{ kg}$$

$$\therefore \text{Total weight of 36 students} = 41 \times 36 \text{ kg} = 1476 \text{ kg}$$

$$\text{After leaving one student, number of students} = 36 - 1 = 35$$

$$\text{Their new mean} = 41.0 - 200\text{g} = (41.0 - 0.2) \text{ kg} = 40.8 \text{ kg.}$$

$$\therefore \text{Total weight of 35 students} = 40.8 \times 35 = 1428 \text{ kg}$$

$$\therefore \text{Weight of leaving student} = (1476 - 1428) \text{ kg} = 48 \text{ kg Ans.}$$

Question 4.**Solution:**

$$\text{Average weight of 39 students} = 40 \text{ kg}$$

$$\therefore \text{Total weight of 39 students} = 40 \times 39 = 1560 \text{ kg}$$

$$\text{By admitting of a new student, no. of students} = 39 + 1 = 40$$

$$\text{and new mean} = 40 \text{ kg} - 200 \text{ g} = 40 \text{ kg} - 0.2 \text{ kg} = 39.8 \text{ kg}$$

$$\therefore \text{Weight of 40 students} = 39.8 \times 40 \text{ kg} = 1592 \text{ kg}$$

$$\therefore \text{Weight of new student} = 1592 - 1560 \text{ kg} = 32 \text{ kg Ans.}$$

Question 5.**Solution:**

$$\text{Average salary of 20 workers} = \text{Rs. } 7650$$

$$\therefore \text{Their total salary} = \text{Rs. } 7650 \times 20 = \text{Rs. } 153000$$

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By adding the salary of the manager, their mean salary = Rs. 8200

$\therefore$ Their total salary = Rs. 8200×21 = Rs. 172200

$\therefore$ Salary of the manager = Rs. 172200 – Rs. 153000 = Rs. 19200 Ans.

Question 6.

Solution:

Average wage of 10 persons = Rs. 9000

Their total wage = Rs. 9000×10 = Rs. 90000

Wage of one person among them = Rs. 8100

and wage of new member = Rs. 7200

$\therefore$ New total wage = Rs. $(90000 - 8100 + 7200)$ = Rs. 89100

Their new mean wage = Rs. $89100/10$ = Rs. 8910

Question 7.

Solution:

Mean consumption of petrol for 7 months of a year = 330 litres

Mean consumption of petrol for next 5 months = 270 litres

$\therefore$ Total consumption for first 7 months = 7×330 = 2310 l

and total consumption for next 5 months = 5×270 = 1350 l

Total consumption for $7 + 5$ = 12 months = $2310 + 1350$ = 3660 l

Average consumption = $3660/12$ = 305 liters per month.

Question 8.

Solution:

Total numbers of numbers = 25

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Mean of 15 numbers = 18

$\therefore$ Total of 15 numbers = $18 \times 15 = 270$

Mean of remaining 10 numbers = 13

$\therefore$ Total = $13 \times 10 = 130$

and total of 25 numbers = $270 + 130 = 400$

$\therefore$ Mean = $400/25 = 16$ Ans.

Question 9.

Solution:

Mean weight of 60 students = 52.75 kg.

Total weight = $52.75 \times 60 = 3165$ kg

Mean of 25 out of them = 51 kg.

$\therefore$ Their total weight = $51 \times 25 = 1275$ kg

$\therefore$ Total weight of remaining $60 - 25 = 35$ students = $3165 - 1275 = 1890$ kg

Mean weight = $1890/35 = 54$ kg Ans.

Question 10.

Solution:

Average increase of 10 oarsman = 1.5 kg.

$\therefore$ Total increased weight = $1.5 \times 10 = 15$ kg

Weight of out going oarsman = 58 kg .

$\therefore$ Weight of new oarsman = $58 + 15 = 73$ kg Ans.

Question 11.

Solution:

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Mean of 8 numbers = 35

$\therefore$ Total of 8 numbers = $35 \times 8 = 280$

After excluding one number, mean of 7 numbers = $35 - 3 = 32$

Total of 7 numbers = $32 \times 7 = 224$

Hence excluded number = $280 - 224 = 56$ Ans.

Question 12.

Solution:

Mean of 150 items = 60

Total of 150 items = $60 \times 150 = 9000$

New total = $9000 + 152 + 88 - 52 - 8 = 9000 + 240 - 60 = 9180$

$\therefore$ New mean = $9180/150 = 61.2$ Ans.

Question 13.

Solution:

Mean of 31 results = 60

$\therefore$ Total of 31 results = $60 \times 31 = 1860$

Mean of first 16 results = 58

$\therefore$ Total of first 16 results = $58 \times 16 = 928$

and mean of last 16 results = 62

$\therefore$ Total of last 16 results = $62 \times 16 = 992$

$\therefore$ 16th result = $(928 + 992) - 1860 = 1920 - 1860 = 60$ Ans.

Question 14.

Solution:

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Mean of 11 numbers = 42

$\therefore$ Total of 11 numbers = $42 \times 11 = 462$

Mean of first 6 numbers = 37

$\therefore$ Total of first 6 numbers = $37 \times 6 = 222$

Mean of last 6 numbers = 46

$\therefore$ Total of last 6 numbers = $46 \times 6 = 276$

$\therefore$ 6th number = $(222 + 276) - 462 = 498 - 462 = 36$ Ans.

Question 15.

Solution:

Mean weight of 25 students = 52 kg

$\therefore$ Total weight of 25 students = $52 \times 25 = 1300$ kg

Mean weight of first 13 students = 48 kg

$\therefore$ Total weight of first 13 students = $48 \times 13 \text{ kg} = 624 \text{ kg}$

Mean of last 13 students = 55 kg

$\therefore$ Total of last 13 students = $55 \times 13 \text{ kg} = 715 \text{ kg}$

$\therefore$ Weight of 13th student = $(624 + 715) - 1300 = 1339 - 1300 = 39 \text{ kg}$ Ans.

Question 16.

Solution:

Mean of 25 observations = 80

Total of 25 observations = $80 \times 25 = 2000$

Mean of another 55 observations = 60

$\therefore$ Total of these 55 observations = $60 \times 55 = 3300$

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Total number of observations = $25 + 55 = 80$

and total of 80 numbers = $2000 + 3300 = 5300$

Mean of 80 observations = $5300/80 = 66.25$ Ans.

Question 17.

Solution:

Marks in English = 36

Marks in Hindi = 44

Marks in Mathematics = 75

Marks in Science = x

$\therefore$ Total number of marks in 4 subjects = $36 + 44 + 75 + x = 155 + x$

Average marks in 4 subjects = 50

$\therefore$ Total marks = $50 \times 4 = 200$

$\therefore 155 + x = 200$

$\Rightarrow x = 200 - 155$

$\Rightarrow x = 45$

Hence, marks in Science = 45 Ans.

Question 18.

Solution:

Mean of monthly salary of 75 workers = Rs. 5680

Total salary of 75 workers = Rs. $5680 \times 75 =$ Rs. 426000

Mean salary of 25 among them = Rs. 5400

Total of 25 workers = Rs. $5400 \times 25 =$ Rs. 135000

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Mean salary of 30 among them = Rs. 5700

∴ Total of 30 among them = Rs. 5700 x 30 = Rs. 171000

∴ Total salary of 25 + 30 = 55 workers = Rs. 135000 + 171000 = Rs. 306000

∴ Total salary of remaining 75 – 55 = 20 workers = Rs. 426000 – 306000 = Rs. 120000

∴ Mean of remaining 20 workers = Rs. 120000/20 = Rs. 6000 Ans.

Question 19.

Solution:

Let distance between two places = 60 km

∴ Time taken at the speed of 15 km/h = $\frac{60}{15} = 4$ hours

and time taken at speed of 10 km/h for coming back = $\frac{60}{10} = 6$ hours

Total time taken = 4 + 6 = 10

hours and distance covered = 60 + 60 = 120 km

∴ Average speed = $\frac{120}{10} = 12$ km/hr.

Question 20.

Solution:

No. of total students = 50

No. of boys = 40

∴ No. of girls = 50 – 40 = 10

Average weight of class = 44kg

∴ Total weight of 50 students = 44 x 50 = 2200 kg

Average weight of 10 girls = 40 kg

∴ Total weight = 40 x 10 = 400 kg

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Total weight of 40 boys = $2200 - 400 = 1800$ kg

$\therefore$ Average weight of 40 boys = $1800/40$ kg = 45 kg Ans.

Ex 14F

Question 1.

Solution:

Daily wages in rupees x_i	No. of workers f_i	$f_i \times x_i$
90	12	1080
110	14	1540
120	13	1560
130	11	1430
150	10	1500
Total	60	7110

$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{\sum f_i} = \frac{7110}{60} = 118.50$$

$\therefore$ Mean = Rs. 118.50 Ans.

Question 2.

Solution:

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Weights (in kg) (x_i)	No. of workers (f_i)	$f_i \times x_i$
60	4	240
63	3	189
66	2	132
69	2	138
72	1	72
Total	12	771

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{771}{12} = 64.25$$

$\therefore$ Mean weight = 64.25 kg Ans.

Question 3.

Solution:

Age (in years) (x_i)	Frequency (f_i)	$f_i \times x_i$
15	3	45
16	8	128
17	9	153
18	11	198
19	6	114
20	3	60
Total	40	698

$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{\sum f_i} = \frac{698}{40} = 17.45$$

$\therefore$ Mean age = 17.45 years Ans.

Question 4.

Solution:

Variable (x_i)	Frequency (f_i)	$f_i \times x_i$
10	7	70
30	8	240
50	10	500
70	15	1050
89	10	890
Total	50	2750

$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{\sum f_i} = \frac{2750}{50} = 55$$

$\therefore$ Mean = 55 Ans.

Question 5.

Solution:

Mean = 8

x_i	f_i	$f_i \times x_i$
3	6	18
5	8	40
7	15	105
9	p	$9p$
11	8	88
13	4	52
Total	$41+p$	$303+9p$

$$\therefore \bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{303+9p}{41+p}$$

$$\Rightarrow \frac{303+9p}{41+p} = \frac{8}{1} \quad (\because \text{Mean} = 8)$$

$$303 + 9p = 328 + 8p \text{ (By cross multiplication)}$$

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

$$\Rightarrow p = 25 \text{ Ans.}$$

Question 6.

Solution:

Mean = 28.25

x_i	f_i	$f_i \times x_i$
15	8	120
20	7	140
25	p	$25p$
30	14	420
35	15	525
40	6	240
Total	$50+p$	$1445+25p$

$$\bar{x} = 28.25$$

$$\text{Now } \bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{1445 + 25p}{50 + p}$$

$$\therefore \frac{1445 + 25p}{50 + p} = 28.25 \Rightarrow \frac{1445 + 25p}{50 + p} = \frac{2825}{100} \quad (\because \text{Mean} = 28.25)$$

$$\Rightarrow 144500 + 2500p = 141250 + 2825p \Rightarrow 144500 - 141250 = 2825p - 2500p$$

$$\Rightarrow 3250 = 325p \Rightarrow p = \frac{3250}{325} = 10 \text{ Ans.}$$

Question 7.

Solution:

Mean = 16.6

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x	f	$fixi$
8	12	96
12	16	192
15	20	300
p	24	$24p$
20	16	320
25	8	200
30	4	120
Total	100	$1228+24p$

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{1228 + 24p}{100}$$

$$\Rightarrow 16.6 = \frac{1228 + 24p}{100} \Rightarrow \frac{166}{10} = \frac{1228 + 24p}{100}$$

($\therefore$ Mean = 16.6)

$$\Rightarrow 12280 + 240p = 16600$$

(By cross multiplication)

$$\Rightarrow 240p = 16600 - 12280 = 4320$$

$$p = \frac{4320}{240} = 18$$

Hence $p = 18$ Ans.

Question 8.

Solution:

Mean = 50

x	f	fx_i
10	17	170
30	f_1	$30f_1$
50	32	1600
70	f_2	$70f_2$
90	19	1710
Total	120	$3480 + 30f_1 + 70f_2$

Now $\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{3480 + 30f_1 + 70f_2}{120}$ ($\because$ Mean = 50)

$$\Rightarrow 50 = \frac{3480 + 30f_1 + 70f_2}{120} \Rightarrow 6000 = 3480 + 30f_1 + 70f_2$$

$$30f_1 + 70f_2 = 6000 - 3480 = 2520$$

$$3f_1 + 7f_2 = 252$$

...(i) (Dividing by 10)

$$\text{But } f_1 + f_2 = 120 - 68 = 52$$

...(ii)

Multiply (i) by 1 and (ii) by 3

$$3f_1 + 7f_2 = 252$$

$$3f_1 + 3f_2 = 156$$

Subtracting

$$\begin{array}{r} - \quad - \quad - \\ 4f_2 = 96 \end{array}$$

$$f_2 = \frac{96}{4} = 24$$

$$\text{But } f_1 + f_2 = 52$$

$$\Rightarrow f_1 + 24 = 52 \Rightarrow f_1 = 52 - 24 = 28$$

Hence $f_1 = 24, f_2 = 28$ Ans.

Question 9.

Solution:

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Weekly wages (x_i)	No. of workers (f_i)	$d_i = (x_i - A)$ $= (x_i - 900)$	$f_i \times d_i$
800	7	-100	-700
820	14	-80	-1120
860	19	-40	-760
900	25	0	0
920	20	20	400
980	10	80	800
1000	5	100	500
Total	98		$\sum f_i d_i = -880$

Let 900 be the assumed mean

$\therefore A = 900$

$$\text{Mean} = A + \frac{\sum f_i d_i}{\sum f_i} = \text{Rs. } 900 + \left(\frac{-880}{98} \right) = \text{Rs. } (900 - 8.98) = \text{Rs. } 891.02 \text{ Ans.}$$

Question 10.

Solution:

Let assumed mean = 67

$$\therefore A = 67$$

Height in cm (x_i)	No. of plants (f_i)	$d_i = \frac{x_i - A}{x_i}$ $A = 67$	$f_i \times d_i$
61	5	-6	-30
62	18	-3	-54
67 = (A)	42	0	0
70	27	3	81
73	8	6	48
Total	100		$\Sigma f_i \times d_i = 45$

$$\text{Mean} = A + \frac{\Sigma f_i d_i}{\Sigma f_i} = 67 + \frac{45}{100} = 67 + 0.45 = 67.45 \text{ cm Ans.}$$

Question 11.

Solution:

Here $h = 1$, Let assumed mean (A) = 21

x	f	$ui = \frac{x_i - 21}{1}$	$fi \times ui$
18	170	-3	-510
19	320	-2	-640
20	530	-1	-530
21 = (A)	700	0	0
22	230	1	230
23	140	2	280
24	110	3	330
Total	2200		-840

$$\therefore \text{Mean} = A + h \times \frac{\sum f_i \times u_i}{\sum f_i}$$

$$= 21 + 1 \times \left(\frac{-840}{2200} \right) = 21 - 0.38 = 20.62 \text{ Ans.}$$

Question 12.

Solution:

Here $h = 400$ and let assumed mean $(A) = 1000$

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x_i	f_i	$u_i = \frac{x_i - 1000}{400}$	$f_i \times u_i$
200	142	-2	-284
600	265	-1	-265
1000=A	560	0	0
1400	271	1	271
1800	89	2	178
2200	16	3	48
Total	1343		-52

$$\therefore \text{Mean} = A + h \times \frac{\sum f_i u_i}{\sum f_i}$$

$$= 1000 + 400 \times \frac{-52}{1343} = 1000 + (-15.49) = 1000 - 15.49 = 984.51 \text{ m Ans.}$$

Ex 14G

Question 1.

Solution:

Arranging in ascending order, we get:

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

Here, number of terms is 9 which is odd.

$\therefore$ Median = $n+1$ th term = $9+1$ th term = 5th term = 7 Ans.

(ii) Arranging in ascending order, we get: 6, 8, 9, 15, 16, 18, 21, 22, 25

Here, number of terms is 9 which is odd.

$\therefore$ Median = $n+1$ th term = $9+1$ th term = 5th term = 16 Ans.

(iii) Arranging in ascending order, we get: 6, 8, 9, 13, 15, 16, 18, 20, 21, 22, 25

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Here, number of terms is 11 which is odd.

$\therefore$ Median = 11+12 th term = 122 th term = 6th term = 16 Ans.

(iv) Arranging in ascending order, we get:

0, 1, 2, 2, 3, 4, 4, 5, 5, 7, 8, 9, 10

Here, number of terms is 13, which is odd.

Median = 13+12 th term = 142 th term = 7th term = 4 Ans.

Question 2.

Solution:

Arranging in ascending order, we get 9, 10, 17, 19, 21, 22, 32, 35

Here, number of terms is 8 which is even

$\therefore$ Median = $12[82\text{th term} + (82+1)\text{th term}]$

= $12 [4\text{th term} + 5\text{th term}] = 12 (19 + 21) = 12 \times 40 = 20$

(ii) Arranging in ascending order, we get:

29, 35, 51, 55, 60, 63, 72, 82, 85, 91

Here number of terms is 10 which is even

$\therefore$ Median = $12[102\text{th term} + (102+1)\text{th term}]$

= $12 (60 + 63) = 12 \times 123 = 61.5$ Ans.

(iii) Arranging in ascending order we get

3, 4, 9, 10, 12, 15, 17, 27, 47, 48, 75, 81

Here number of terms is 12 which is even.

$\therefore$ Median = $12[122\text{th term} + (122+1)\text{th term}]$

= $12 (6\text{th term} + 7\text{th term}) = 12 (15 + 17) = 12 \times 32$

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= 16 Ans.

Question 3.

Solution:

Arranging the given data in ascending order, we get :

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

$\therefore$ Median = 15+12 th term = 162 th term = 8th term = 23

$\therefore$ Median score = 23 Ans.

Question 4.

Solution:

Arranging in ascending order, we get:

143.7, 144.2, 145, 146.5, 147.3, 148.5, 149.6, 150, 152.1

Here, number of terms is 9 which is odd.

Median = 9+12 th term = 102 th term = 5th term = 147.3 cm

Hence, median height = 147.3 cm Ans.

Question 5.

Solution:

Arranging in ascending order, we get:

9.8, 10.6, 12.7, 13.4, 14.3, 15, 16.5, 17.2

Here number of terms is 8 which is even

$\therefore$ Median = $12[82\text{th term} + (82+1)\text{th term}]$

= $12[4\text{th term} + 5\text{th term}]$

= $12 (13.4 + 14.3) = 12 (27.7) = 13.85$

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$\therefore$ Median weight = 13.85 kg. Ans.

Question 6.

Solution:

Arranging in ascending order, we get:

32, 34, 36, 37, 40, 44, 47, 50, 53, 54

Here, number of terms is 10 which is even.

$$\therefore \text{Median} = 12[102^{\text{th}}\text{term} + (102+1)^{\text{th}}\text{term}]$$

$$= 12 [5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term}] = 12 (40 + 44) = 12 \times 84 = 42 .$$

$\therefore$ Median age = 42 years.

Question 7.

Solution:

The given ten observations are 10, 13, 15, 18, $x + 1$, $x + 3$, 30, 32, 35, 41

These are even

$$\therefore \text{Median} = 12[102^{\text{th}}\text{term} + (102+1)^{\text{th}}\text{term}]$$

$$= 12 [5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term}] = 12(x + 1 + x + 3) = 12(2x + 4)$$

$$= x + 2$$

But median is given = 24

$$\therefore x + 2 = 24 \Rightarrow x = 24 - 2 = 22$$

Hence $x = 22$.

Question 8.

Solution:

Preparing the cumulative frequency table, we have:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Weights (in kg)	No. of students (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 = $\frac{41+1}{2}$ th term = 21st term = 50 ($\because$ 20th to 28th term = 50)

Hence median weight = 50 kg Ans.

Question 9.

Solution:

Arranging first in ascending order, we get:

Variety	15	17	20	22	25	30
Frequency	3	5	9	4	6	10

Now preparing its cumulative frequency table

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Variety	Frequency	c.f
15	3	3
17	5	8
20	9	17
22.	4	21
25	6	27
30	10	37

Here, number of terms is 37 which is odd.

Median = $\frac{37+1}{2}$ th term = 19 th term = 22 ($\therefore$ 18th to 21st = 22)

Hence median – 22 Ans.

Question 10.

Solution:

first arranging in ascending order we get

Marks	9	20	25	40	50	80
No. of students	4	6	16	8	7	2

Now preparing its cumulative frequency table, we find:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Marks	No. of students (f)	C.f.
9	4	4
20	6	10
25	16	26
40	8	34
50	7	41
80	2	43

Here, number of terms is 43, which is odd.

Median = $\frac{43+1}{2}$ th term = 22nd term = 25 (∵ 11th to 26th = 25)

Question 11.

Solution:

Arranging in ascending order, we get

Height (in cm)	151	152	153	154	155	156	157
Number of students	6	3	12	4	10	8	7

Now preparing its cumulative frequency table, we find :

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Height (in cm)	No. 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 = 50 which is even

$$\therefore \text{Median} = 12[50^{\text{th}}\text{term} + (50+1)^{\text{th}}\text{term}]$$

$$= 12 (154 + 155) = 12 (309) = 154.5 \quad (\because 22^{\text{nd}} \text{ to } 25^{\text{th}} = 154, 26^{\text{th}} \text{ to } 34^{\text{th}} = 155)$$

Question 12.

Solution:

Arranging in ascending order, we get:

Variate	16	18	20	23	25	26	28	30
Frequency	9	8	13	4	4	6	11	5

Now, preparing its cumulative frequency table.

Here, number of terms is 60 which is even

$$\therefore \text{Median} = 12[60^{\text{th}}\text{term} + (60+1)^{\text{th}}\text{term}]$$

$$= 12 (30^{\text{th}} \text{ term} + 31^{\text{st}} \text{ term})$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

$$= 12 (20 + 23) = 12 \times 43 = 21.5 \text{ (}\therefore \text{ 18th to 30th term} = 20, \text{ 31st term to 34th} = 23)$$

Hence median = 21.5 Ans.

Ex 14H

Question 1.

Solution:

Arranging the given data in ascending order :

0, 0, 1, 2, 3, 4, 5, 5, 6, 6, 6, 6

We see that 6 occurs in maximum times.

Mode = 6 Ans.

Question 2.

Solution:

Arranging in ascending order, we get:

15, 20, 22, 23, 25, 25, 25, 27, 40

We see that 25 occurs in maximum times.

Mode = 25 Ans.

Question 3.

Solution:

Arranging in ascending order we get:

1, 1, 2, 3, 3, 4, 5, 5, 6, 6, 7, 8, 9, 9, 9, 9, 9

Here, we see that 9 occurs in maximum times.

Mode = 9 Ans.

Question 4.

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Solution:

Arranging in ascending order, we get:

9, 19, 27, 28, 30, 32, 35, 50, 50, 50, 50, 60

Here, we see that 50 occurs in maximum times.

Modal score = 50 scores Ans.

Question 5.**Solution:**

Arranging in ascending order, we get:

10, 10, 11, 11, 12, 12, 13, 14, 15, 17

Here, number of terms is 10, which is even

$\therefore$ Median = $\frac{10^{\text{th}} \text{ term} + (10+1)^{\text{th}} \text{ term}}{2}$

= $\frac{12 + 12}{2}$ (5th term + 6th term)

$$= \frac{1}{2}(12 + 12) = \frac{1}{2} \times 24 = 12$$

$$\text{Mean} = \frac{\sum x_i}{n} = \frac{10+10+11+11+12+12+13+14+15+17}{10} = \frac{125}{10} = 12.5$$

Now, mode = 3 median – 2 mean = $3 \times 12 - 2 \times 12.5 = 36 - 25 = 11$ Ans.

Question 6.**Solution:**

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Here, number of terms is 25, which is odd.

$$\therefore \text{Median} = \frac{25+1}{2} \text{ th term} = \frac{26}{2} \text{ th term} = 13 \text{ th term} = 13 (\because 13\text{th to } 17\text{th} = 13)$$

$$\text{Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{332}{25} = 13.28$$

$$\text{Now, mode} = 3 \text{ median} - 2 \text{ mean} = 3 \times 13 - 2 \times 13.28 = 39 - 26.56 = 12.44$$

Hence, mode = 12.44 Ans.

Question 7.

Solution:

Writing its cumulative frequency table

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Item (x_i)	Frequency (f_i)	$c.f$	$f_i \times x_i$
5	6	6	30
7	5	11	35
9	3	14	27
12	6	20	72
14	5	25	70
17	3	28	51
19	2	30	38
21	4	34	84
Total	34		407

Here, number of items is 34, which is even.

$$\begin{aligned}\therefore \text{Median} &= \frac{1}{2} \left[\frac{34}{2} \text{th term} + \left(\frac{34}{2} + 1 \right) \text{th term} \right] = \frac{1}{2} (17\text{th term} + 18\text{th term}) \\ &= \frac{1}{2} (12 + 12) = \frac{1}{2} \times 24 = 12 \quad (\because 15\text{th to } 20\text{th} = 12)\end{aligned}$$

$$\text{Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{407}{34} = 11.97$$

$$\therefore \text{Mode marks} = 3 \text{ median} - 2 \text{ mean} = 3 \times 12 - 2 \times 11.97 = 36 - 23.94 = 12.06 \text{ Ans.}$$

Question 8.

Solution:

Writing its cumulative frequency table

X	f	$c.f.$	$fi \times xi$
18	6	6	108
20	7	13	140
25	3	16	75
30	7	23	210
34	7	30	238
38	5	35	190
40	5	40	200
Total	40		1161

Here, number of items is 40 which is even.

$$\therefore \text{Median} = 12[40^{\text{th}}\text{term} + (40+1)^{\text{th}}\text{term}]$$

$$= 12 (20^{\text{th}} \text{ term} + 21^{\text{th}} \text{ term})$$

$$= 12 (30 + 30) = 12 \times 60 = 30$$

$$\text{Mean} = \frac{\sum fix_i}{\sum f_i} = \frac{1161}{40} = 29.025$$

$$\therefore \text{Mode} = 3 \text{ median} - 2 \text{ mean} = 3 \times 30 - 2 \times 29.025 = 90 - 58.05 = 31.95$$

Question 9.

Solution:

Preparing its cumulative frequency table we get:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Weight (in kg) (x)	Number of persons (f)	$c.f$	$f_i \times x_i$
42	3	3	126
47	8	11	376
52	6	17	312
57	8	25	456
62	11	36	682
67	5	41	335
72	9	50	648
Total	50		2935

Here number of terms is 50, which is even

$$\begin{aligned}
 \text{(i) } \therefore \text{ Median} &= \frac{1}{2} \left[\frac{50}{2} \text{th term} + \left(\frac{50}{2} + 1 \right) \text{th term} \right] \\
 &= \frac{1}{2} (25\text{th term} + 26\text{th term}) = \frac{1}{2} (57 + 62) \quad (18\text{th to } 25\text{th} = 57, 26\text{th to } 36\text{th} = 62) \\
 &= \frac{119}{2} = 59.5 \\
 \therefore \text{ Median} &= 59.5 \text{ kg}
 \end{aligned}$$

$$\text{(ii) Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{2935}{50} = 58.7 \text{ kg}$$

$$\begin{aligned}
 \text{(iii) Mode} &= 3 \text{ median} - 2 \text{ mean} = 3(59.5) - 2(58.7) \\
 &= 178.5 - 117.4 = 61.1 \text{ kg Ans.}
 \end{aligned}$$

Question 10.

Solution:

Preparing its cumulative frequency table :

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Marks (x)	Number of students (f)	c.f.	fx
4	8	8	32
12	10	18	120
20	16	34	320
28	24	58	672
36	15	73	540
44	7	80	308
Total	80		1992

Here, number of terms is 80 which is even.

$$\begin{aligned}
 \therefore \text{Median} &= \frac{1}{2} \left[\frac{80}{2} \text{th term} + \left(\frac{80}{2} + 1 \right) \text{th term} \right] \\
 &= \frac{1}{2} (40 \text{th term} + 41 \text{th term}) = \frac{1}{2} (28 + 28) \quad (\because 35 \text{th to } 58 \text{th} = 28) \\
 &= \frac{1}{2} \times 56 = 28
 \end{aligned}$$

$$\text{Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{1992}{80} = 24.9$$

$$\begin{aligned}
 \text{Model marks} &= 3 (\text{median}) - 2 (\text{mean}) \\
 &= 3 (28) - 2 \times 24.9 = 84 - 49.8 = 34.2 \text{ Ans.}
 \end{aligned}$$

Question 11.

Solution:

Preparing its cumulative frequency table we have,

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Age (in years) (x)	Number of persons(f)	c.f.	fixi
19	13	13	247
21	15	28	315
23	16	44	368
25	18	62	450
27	16	78	432
29	15	93	435
31	13	106	403
Total	106		2650

Here, number of terms is 106 which is even.

$$\therefore \text{Median} = \frac{1}{2} \left[\frac{106}{2} \text{th term} + \left(\frac{106}{2} + 1 \right) \text{th term} \right]$$

$$= \frac{1}{2} (53 \text{rd term} + 54 \text{th term}) = \frac{1}{2} (25 + 25) (\because 45\text{th to } 62\text{nd} = 25]$$

$$= \frac{1}{2} \times 50 = 25$$

$$\text{Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{2650}{106} = 25$$

$$\text{Mode} = 3(\text{median}) - 2(\text{mean}) = 3 \times 25 - 2 \times 25 = 75 - 50 = 25$$

Hence Mean = Median = Mode = 25 Ans.

Question 12.

Solution:

Preparing its cumulative frequency table we have,

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-9-maths-chapter-14-statistics/>

Weight (in kg) (x)	Number of students (f)	c.f.	$f_i \times x_i$
47	4	4	188
50	3	7	150
53	2	9	106
56	2	11	112
60	4	15	240
Total	15		796

Here the number of terms = 15, which is odd

$$\therefore \text{Median} = \frac{15+1}{2} \text{th term} = \frac{16}{2} \text{th term} = 8\text{th term} = 53 \text{ (8th to 9th = 53)}$$

$$\text{Mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{796}{15} = 53.06$$

$$\therefore \text{Mode} = 3(\text{median}) - 2(\text{mean}) \\ = 3 \times 53 - 2 \times 53.06 = 159 - 106.12 = 52.88 \text{ Ans.}$$



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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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