CLASS – 10

MATHEMATICS

CH – 13
STATISTICS

CBSE Board

Previous Year Questions – 2

Shubham Tiwari

22. Heights of 50 students in class X of a school are recorded and following data is obtained: (CBSE Term II, 2022)

Height (in cm)	Number of students
130 – 135	4
135 – 140	11
140 – 145	12
145 – 150	7
150 – 155	10
155 – 160	6

Find the median height of the students.

Solution

Height (in cm)	Number of students	Cumulative Frequency (c.f.)
130 – 135	4	4
135 – 140	11	15
140 – 145	12	27
145 – 150	7	34
150 – 155	10	44
155 – 160	6	50

$\frac{N}{2} = \frac{50}{2} = 25$

Median

$N = \Sigma f_i = 50$

$$\text{med} = l + \left[\frac{\frac{N}{2} - cf}{f}\right] \times h$$

$$= 140 + \left[\frac{25 - 15}{12}\right] \times 5$$

$$= 140 + \left[\frac{10}{12} \times 5\right]$$

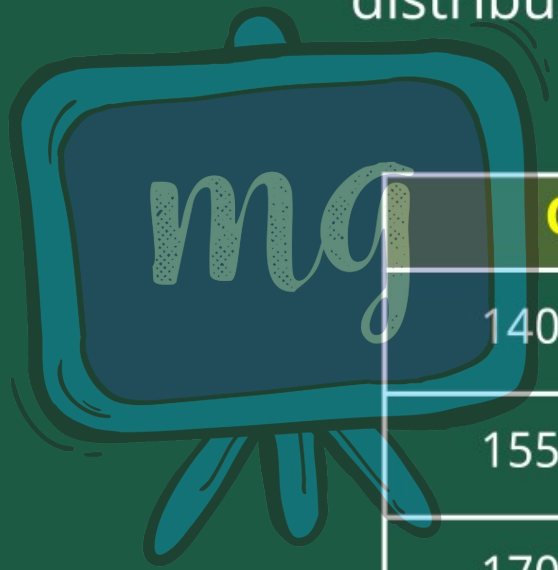
$$= 140 + \frac{50}{12} \quad \frac{25}{6}$$

$$= 140 + 4.16$$

Median = 144.16

23. For the following frequency distribution, find the median :

(CBSE Term II, 2022)



Class	Frequency
1400 – 1550	6
1550 – 1700	13
1700 – 1850	25
1850 – 2000	10

24. India meteorological department observe seasonal and annual rainfall every year in different sub- divisions of our country. (CBSE 2023)

It helps them to compare and analyse the results. The table given below shows sub-division wise seasonal (monsoon) rainfall (mm) in 2018 :

Rainfall (mm)	Number of Sub-divisions
200 – 400	2
400 – 600	4
600 – 800	7
800 – 1000	4
1000 – 1200	2
1200 – 1400	3
1400 – 1600	1
1600 – 1800	1

Based on the above information, answer the following questions.

600-800

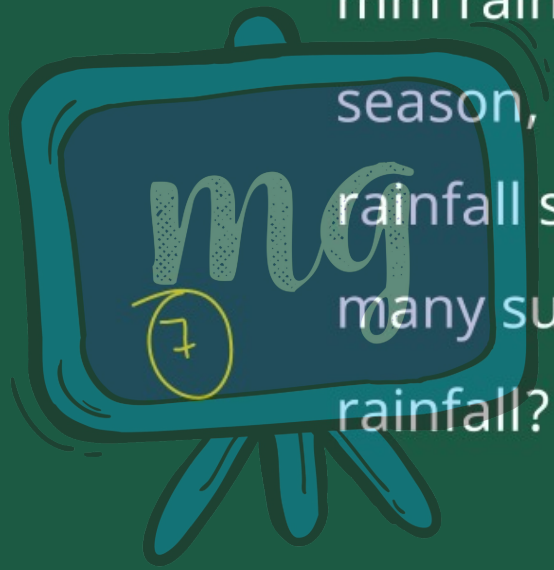
(I) Write the modal class.

(II) Find the median of the given data.

OR

Find the mean rainfall in this season.

(III) If sub-division having at least 1000 mm rainfall during monsoon season, is considered good rainfall sub-division, then how many sub-divisions had good rainfall?



Solution

Rainfall (mm)	Number of Sub-divisions	Cumulative Frequency (c.f.)
200 – 400	2	2
400 – 600	4	6
600 – 800	7	13
800 – 1000	4	17
1000 – 1200	2	19
1200 – 1400	3	22
1400 – 1600	1	23
1600 – 1800	1	24

$\frac{N}{2} = \frac{24}{2} = 12$

median

$N = \Sigma f_i = 24$

$$\text{median} = l + \left[\frac{\frac{N}{2} - (f)}{f}\right] \times h$$

$$= 600 + \left[\frac{12 - 6}{7}\right] \times 200$$

$$= 600 + \left[\frac{6}{7} \times 200\right]$$

$$= 600 + \left[\frac{12}{7} \times 100\right]$$

$$= 600 + 1.714 \times 100$$

$$= 600 + 171.4 = 771.4$$

$a = 900, h = 200$

Rainfall (mm)	Number of Sub-divisions (fi)	x_i	$d_i = x_i - a$	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
200 – 400	2	300	-600	-3	-6
400 – 600	4	500	-400	-2	-8
600 – 800	7	700	-200	-1	-7
800 – 1000	4	900	0	0	0
1000 – 1200	2	1100	200	1	2
1200 – 1400	3	1300	400	2	6
1400 – 1600	1	1500	600	3	3
1600 – 1800	1	1700	800	4	4

$N = \Sigma f_i = 24$

$\Sigma f_i u_i = -6$

$$\text{mean} = = a + \left[\frac{\Sigma f_i u_i}{\Sigma f_i}\right] \times h$$

$$= 900 + \left[\frac{-16}{24}\right] \times 200$$

$$= 900 - \frac{1}{4} \times 200$$

$$= 900 - 50$$

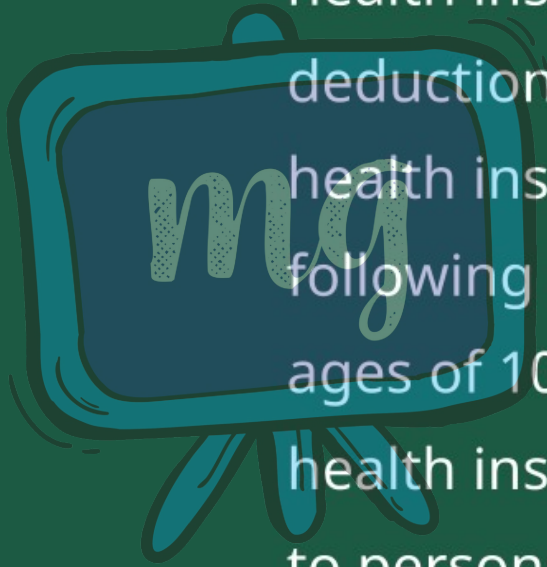
$$\text{mean} = 850$$

25. The monthly expenditure on milk in 200 families of a Housing Society is given below : (CBSE 2023)

Monthly Expenditure (in)	Number of Students
1000 – 1500	24
1500 – 2000	40
2000 – 2500	33
2500 – 3000	x
3000 – 3500	30
3500 – 4000	22
4000 – 4500	16
4500 – 5000	7

Find the value of x and also, find the median and mean expenditure on milk.

26. Health insurance is an agreement whereby the insurance company agrees to undertake a guarantee of compensation for medical expenses in case the insured falls ill or meets with an accident which leads to hospitalisation of the insured.



The government also promotes health insurance by providing a deduction from income tax. An SBI health insurance agent found the following data for distribution of ages of 100 policy holders. The health insurance policies are given to persons having age 15 years and onwards but less than 60 years.

(CBSE Term II, 2022)

Age (in years)	Number of Policy Holders
15 – 20	2
20 – 25	4
25 – 30	18
30 – 35	21
35 – 40	33
40 – 45	11
45 – 50	3
50 – 55	6
55 – 60	2

(i) Find the modal age of the policy holders.

(ii) Find the median age of the policy holders.

27. During the annual sports meet in a school, all the athletes were very enthusiastic. They all wanted to be the winner so that their house could stand first. The instructor noted down the time taken by a group of students to complete a certain race. The data recorded is given below : (CBSE 2021 C)

Time (in sec)	Number of students
0 – 20	1
20 – 40	4
40 – 60	3
60 – 80	7
80 – 100	5

30 + 40 = 70

60 + 60

2

2

mode

to

f_1

f_2

$$\text{mode} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$$

$$= 60 + \left[\frac{7-3}{2\times 7 - 3 - 5}\right] \times 20$$

$$= 60 + \left[\frac{4}{14-8}\right] \times 20$$

$$= 60 + \left[\frac{4}{6}\right] \times 20$$

$$= 60 + \frac{40}{3} =$$

$60 + 1.333 \times 10$

$60 + 13.33$

$= 73.33 = \text{mode}$

Based on the above, answer the following questions:

I. What is the class mark of the modal class?

A. 60

B. 70

C. 80

D. 140

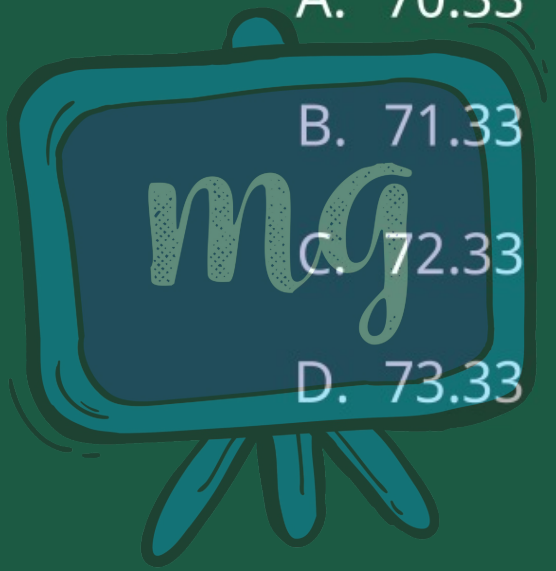
II. The mode of the given data is

A. 70.33

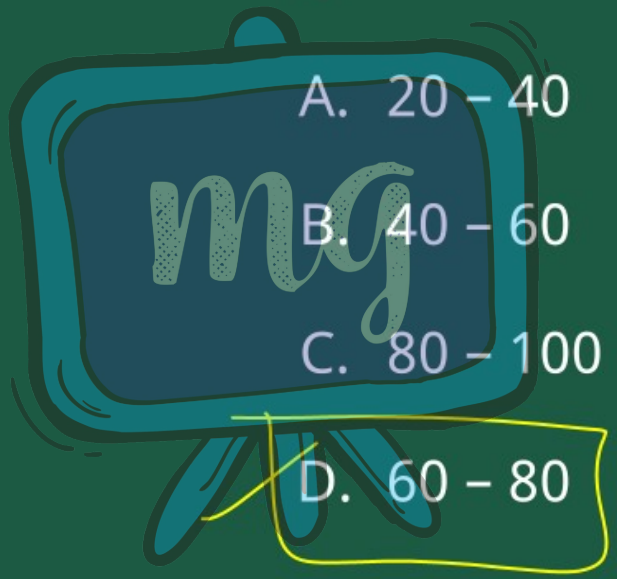
B. 71.33

C. 72.33

D. 73.33



III. The median class of the given data is



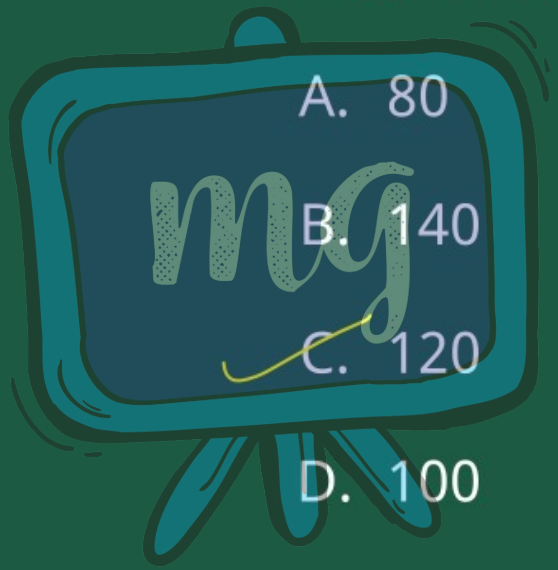
A. 20 – 40

B. 40 – 60

C. 80 – 100

D. 60 – 80

IV. The sum of the lower limits of median class and modal class is



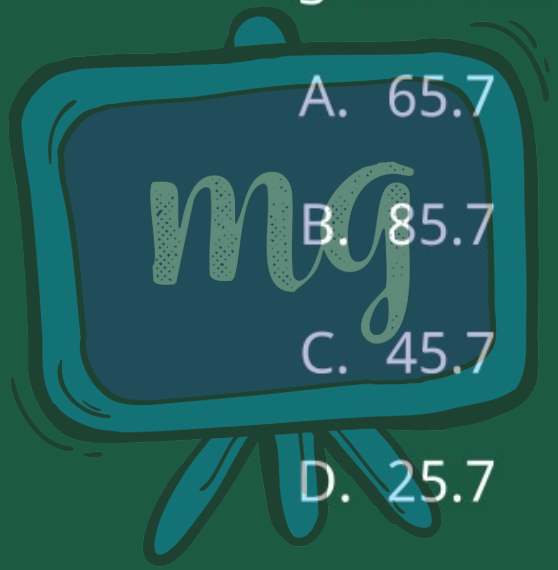
A. 80

B. 140

C. 120

D. 100

V. The median time (in seconds) of the given data is



A. 65.7

B. 85.7

C. 45.7

D. 25.7

Solution

Time (in sec)	Number of students (f_i)	Cumulative Frequency (c.f.)
0 – 20	1	1
20 – 40	4	5
40 – 60	3	8
60 – 80	7	15
80 – 100	5	20

$N = \frac{n}{2} = \frac{20}{2} = 10$

median

c.f

$N = \sum f_i = 20$

$$\text{med} = l + \left[\frac{\frac{N}{2} - Cf}{f}\right] \times h$$

$$= 60 + \left[\frac{10 - 6}{7}\right] \times 20$$

$$= 60 + \left[\frac{2 \times 20}{7}\right]$$

$$= 60 + \frac{40}{7}$$

$$= 60 + 5.71 = 65.71$$

28. The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and the median of the number of wickets taken. (CBSE 2020)

Number of Wickets	Number of Bowlers
20 – 60	7
60 – 100	5
100 – 140	16
140 – 180	12
180 – 220	2
220 – 260	3

29. The median of the following data is 525. Find the values of x and y, if total frequency is 100. (NCERT, CBSE 2020)

Class	Frequency
0 – 100	2
100 – 200	5
200 – 300	x
300 – 400	12
400 – 500	17
500 – 600	20
600 – 700	Y
700 – 800	9
800 – 900	7
900 – 1000	4

Solution

Class	Frequency	Cumulative Frequency (c.f.)
0 – 100	2	2
100 – 200	5	7
200 – 300	x	7 + x
300 – 400	12	19 + x
400 – 500	17	36 + x
500 – 600	20	56 + x
600 – 700	Y	56 + x + y
700 – 800	9	65 + x + y
800 – 900	7	72 + x + y
900 – 1000	4	76 + x + y

$N = \sum f_i = 100$

$N = 76 + x + y$

$100 = 76 + x + y$

$24 = x + y$

$24 - 9 = y$

$15 = y$

$$\text{med} = l + \left[\frac{\frac{N}{2} - (f}{f}\right] \times h$$

$$+ \left[\frac{50 - (36+x)}{20}\right] 5$$

$$50 - 36 - x$$

$$5 = 14 - x$$

$$x = 14 - 5$$

$$\boxed{x = 9}$$

30. If the median of the following frequency distribution is 32.5, find the values of f_1 and f_2. (CBSE 2019)

Class	Frequency
0 – 10	f_1
10 – 20	5
20 – 30	9
30 – 40	12
40 – 50	f_2
50 – 60	3
60 – 70	2
Total	40