Statistics

CHAPTER 14

TRY YOURSELF SOLUTIONS

1. (i) True (ii) False

2. (i) Secondary data (ii) Secondary data
(iii) Primary data

3. Here, highest value = 50, lowest value = 27
∴ Range = Highest value – Lowest value
= 50 – 27 = 23

4. We have,
Range = Highest value – Lowest value
⇒ 14 = Highest value – 16
⇒ Highest value = 14 + 16 = 30

5. Arranging the data in ascending order, we get
106, 108, 110, 111, 112, 115, 116, 117, 118, 119, 120, 120, 122, 125, 130, 132
Here, highest value = 132 and lowest value = 106
∴ Range = Highest value – Lowest value
= 132 – 106 = 26

6. The frequency distribution table is :

No. of children	Tally marks	No. of families
0	𝍸	5
1	𝍸 ||	7
2	𝍸 𝍸 ||	12
3	𝍸	5
4	𝍸 |	6
5	|||	3
6	|||	3

7. Arranging the given data in ascending order, we get
14, 14, 14, 14, 15, 15, 15, 15, 15, 15, 15, 15, 16, 16, 16, 16, 16, 16, 16, 16, 16, 17, 17, 17.
The frequency distribution table is :

Age	Tally marks	Frequency
14	||||	4
15	𝍸 |||	8
16	𝍸 𝍸	10
17	|||	3

8.

Class interval	Tally marks	Frequency
110 - 115	|	1
115 - 120	||	2
120 - 125	||	2
125 - 130	𝍸	5
130 - 135	𝍸 |||	8
135 - 140	||	2

9.

Class interval	Tally marks	Frequency
0 - 9	|	1
10 - 19	||	2
20 - 29	||||	4
30 - 39	𝍸 |	6
40 - 49	𝍸 𝍸 𝍸	15
50 - 59	𝍸 𝍸 ||	12
60 - 69	𝍸 𝍸	10
70 - 79	𝍸 |	6
80 - 89	|||	3
90 - 99	|	1

Number of shelves having more than 49 books = 12 + 10 + 6 + 3 + 1 = 32

10. Consider the classes 100 - 103 and 104 - 107.
∴ Lower limit of 104 - 107 = 104 and upper limit of 100 - 103 = 103.
Their difference = 104 – 103 = 1
So, half of difference = 1/2 = 0.5
Thus, add 0.5 to each upper limit and subtract 0.5 from each lower limit.
The required continuous frequency distribution is :

Class interval	Frequency
99.5 - 103.5	8
103.5 - 107.5	8
107.5 - 111.5	7
111.5 - 115.5	10
115.5 - 119.5	15
119.5 - 123.5	6

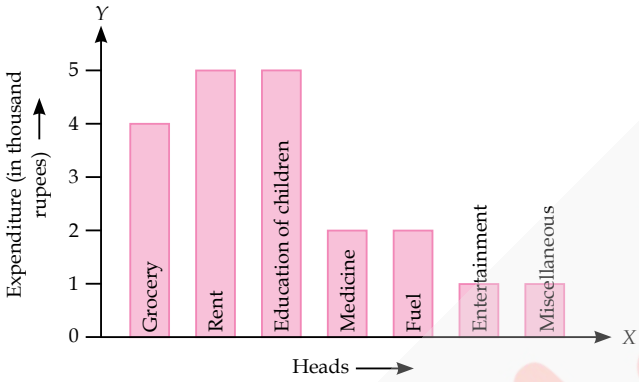
11. Class size (h) = Difference of any two consecutive class marks = 42 – 37 = 5

$\therefore$ Lower limit of last class = $a - \frac{h}{2} = 57 - \frac{5}{2} = 54.5$

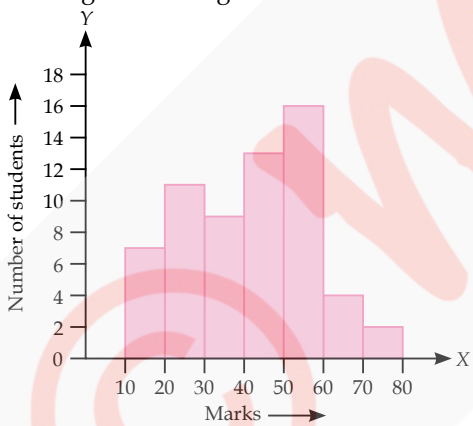
Upper limit of last class = $a + \frac{h}{2} = 57 + \frac{5}{2} = 59.5$

12. (i) 4 students were born in the month of November.
(ii) The maximum number of students were born in the month of August.

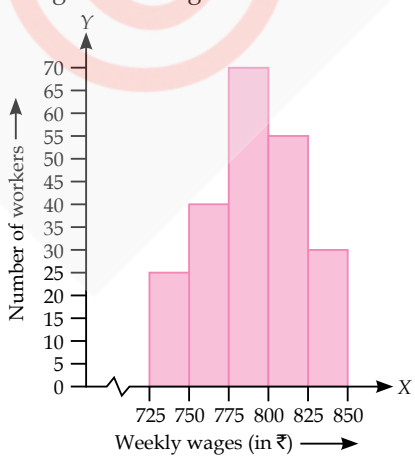
13. Let us represent the heads on horizontal axis using any fixed scale and represent the expenditure on vertical axis by using scale 1 unit = ₹ 1000 ($\because$ the expenditure is in thousand rupees).
Now, the required graph is :



14. The histogram of the given distribution is :



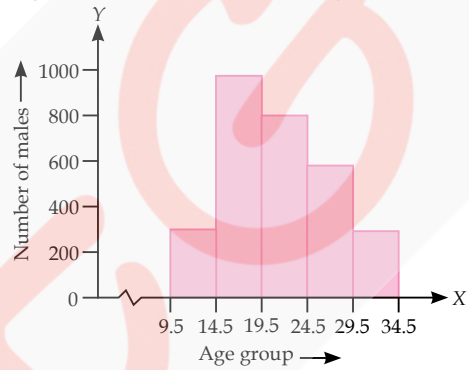
15. The histogram of the given distribution is :



16. The given frequency distribution is not continuous. So, we shall first convert it into a continuous frequency distribution.
So, the modified frequency distribution table is :

Age group	No. of males
9.5 - 14.5	300
14.5 - 19.5	980
19.5 - 24.5	800
24.5 - 29.5	580
29.5 - 34.5	290

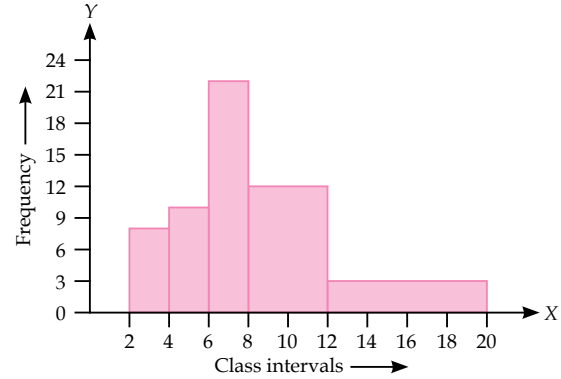
The histogram of the above frequency distribution is :



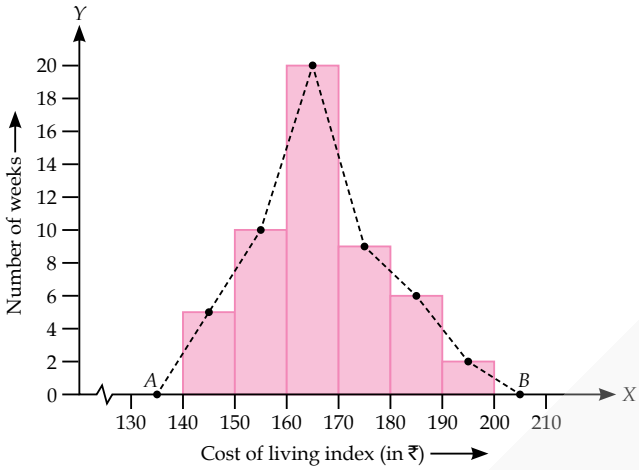
17. In the given distribution the class intervals are not of equal width.
So, we would make modifications in the heights of rectangles, so that the area of the rectangles are proportional to the frequencies. Thus, we have

Class interval	Frequency	Width of the class	Height of the rectangle
2 - 4	8	2	$\frac{2}{2} \times 8 = 8$
4 - 6	10	2	$\frac{2}{2} \times 10 = 10$
6 - 8	22	2	$\frac{2}{2} \times 22 = 22$
8 - 12	24	4	$\frac{2}{4} \times 24 = 12$
12 - 20	12	8	$\frac{2}{8} \times 12 = 3$

The histogram of the data is given below :



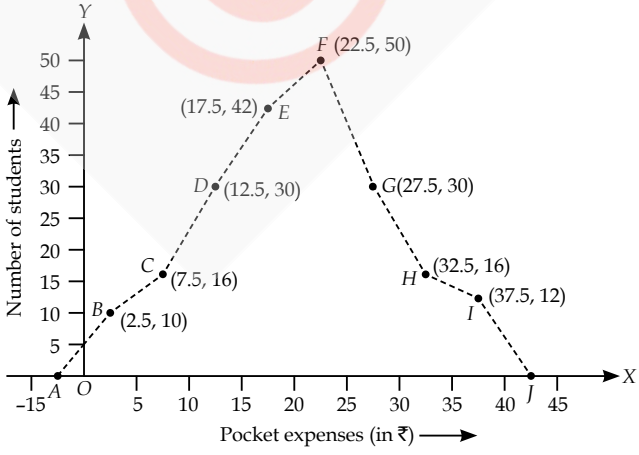
18. Let us first draw the histogram for this data.
Now, we join the mid-points of the tops of adjacent rectangles by line segments. Also, we take the imagined classes 130-140 and 200-210, each with frequency 0. The class marks of these classes are 135 and 205 respectively. Thus, we obtain a complete frequency polygon, shown below :



19. To draw frequency polygon, we find marks of given classes. So, the new frequency distribution table is:

Pocket expense (in ₹)	Class mark	Number of students
0 - 5	2.5	10
5 - 10	7.5	16
10 - 15	12.5	30
15 - 20	17.5	42
20 - 25	22.5	50
25 - 30	27.5	30
30 - 35	32.5	16
35 - 40	37.5	12

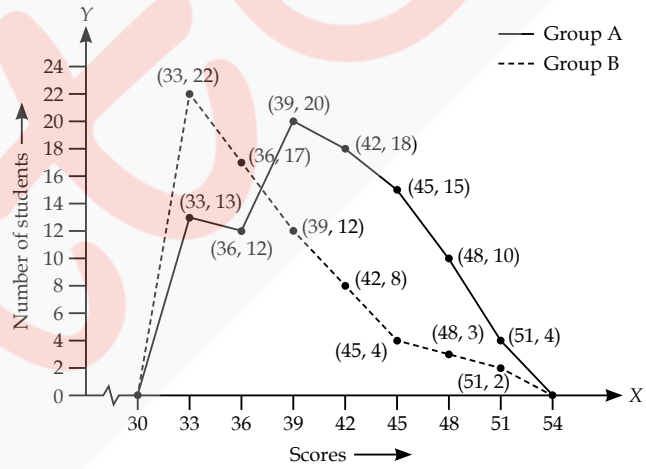
Thus, *OABCDEFGHIJ* is the required frequency polygon.



20. Here, the class intervals are not continuous. Therefore, we make them continuous and find the class marks of the classes.
So, the continuous table is as follows :

Scores	Class marks	Group *A*	Group *B*
31.5 - 34.5	33	13	22
34.5 - 37.5	36	12	17
37.5 - 40.5	39	20	12
40.5 - 43.5	42	18	8
43.5 - 46.5	45	15	4
46.5 - 49.5	48	10	3
49.5 - 52.5	51	4	2

So, the two frequency polygons are shown as :



21. Mean time = $\frac{\text{Total no. of hours spend}}{\text{No. of people}}$

$= \frac{10+7+13+20+15}{5} = \frac{65}{5} = 13$ hours

22. Since, 8 is the mean of 6, 4, 7, p, 10.

$\therefore \quad 8 = \frac{6+4+7+p+10}{5}$

$\Rightarrow \quad 40 = 27 + p \Rightarrow p = 13.$

23.

x_i	f_i	$x_i f_i$
4	5	20
6	10	60
9	10	90
10	7	70
15	8	120
	$\Sigma f_i = 40$	$\Sigma x_i f_i = 360$

$\therefore \quad$ Mean $(\bar{x}) = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{360}{40} = 9$

24.

x_i	f_i	$x_i f_i$
10	6	60
15	8	120
20	p	$20p$
25	10	250
30	6	180
	$\Sigma f_i = 30 + p$	$\Sigma x_i f_i = 610 + 20p$

Now, mean = 20.2

$\Rightarrow \quad \frac{\sum f_i x_i}{\sum f_i} = 20.2 \Rightarrow \frac{610 + 20p}{30 + p} = 20.2$

$\Rightarrow$ $610 + 20p = 606 + 20.2p$

$\Rightarrow$ $0.2p = 4 \Rightarrow p = 20$

25. As we know that, if each observation is decreased by 5, then mean of new observations is $(\bar{x} - 5)$.

$\therefore$ New mean = 50 – 5 = 45

26. It is correct. Since the 2nd data is obtained by multiplying each observation of 1st data by 2, therefore, the new mean will be 2 times the mean of the 1st data.

27. We have, Average age of Shikha and Amit = 48 years

$\Rightarrow$ Sum of ages of Shikha and Amit

= 48 × 2 = 96 years …(i)

Similarly, sum of ages of Shikha, Amit and Advika

= 39 × 3 = 117 years

$\Rightarrow$ Sum of ages of Shikha and Amit + Age of Advika = 117

$\Rightarrow$ 96 + Age of Advika = 117 [From (i)]

$\Rightarrow$ Age of Advika = 117 – 96 = 21 years

28. Arranging the given data in ascending order, we get

15, 16, 16, 19, 25, 28, 28, 32, 36, 40, 42

Here, the number of observations (n) = 11 (odd)

$\therefore$ Median = Value of $\left(\frac{n+1}{2}\right)^{th}$ observation

= Value of $\left(\frac{11+1}{2}\right)^{th}$ observation

= Value of 6^{th} observation = 28

29. Arranging the given data in ascending order, we get

0, 5, 10, 18, 23, 32, 35, 37, 65, 72, 82, 92

Here, the number of observations (n) = 12 (even)

$\therefore$ Median

$$= \frac{\text{Value of } \left(\frac{12}{2}\right)^{th} \text{ observation + Value of } \left(\frac{12}{2}+1\right)^{th} \text{ observation}}{2}$$

$$= \frac{\text{Value of } 6^{th} \text{ observation + Value of } 7^{th} \text{ observation}}{2}$$

$\Rightarrow$ Median = $\frac{32+35}{2} = \frac{67}{2} = 33.5$

30. Here, the number of observations (n) = 10 (even)

$\therefore$ Median

$$= \frac{\text{Value of } \left(\frac{10}{2}\right)^{th} \text{ observation + Value of } \left(\frac{10}{2}+1\right)^{th} \text{ observation}}{2}$$

$$\Rightarrow \quad 24 = \frac{\text{Value of } 5^{th} \text{ observation + Value of } 6^{th} \text{ observation}}{2}$$

$\Rightarrow$ $24 = \frac{(x+2)+(x+4)}{2} \Rightarrow 24 = \frac{2x+6}{2}$

$\Rightarrow$ $24 = x + 3 \Rightarrow x = 21$.

31. Arrange the data in ascending order, we get

2, 3, 3, 4, 4, 4, 5, 5, 6, 6, 6, 7, 7, 7, 9, 9, 9, 9, 10, 10

Here, 9 occurs most frequently, *i.e.*, four times. So, the mode is 9.

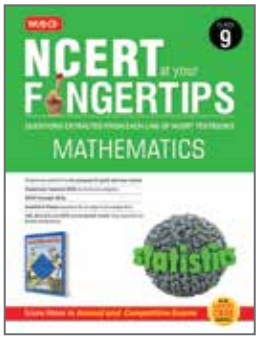
32. Here, mode = 25

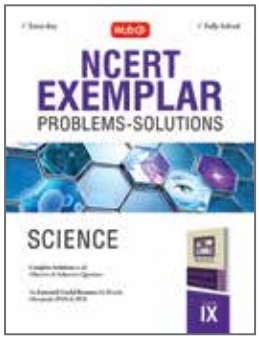
So, 25 should be the most occurring observation.

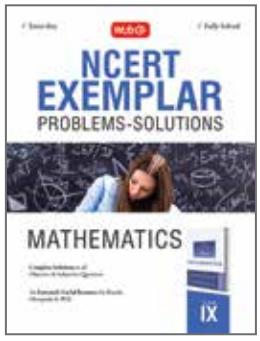
In the given data, 23 and 25 both occurs 3 times.

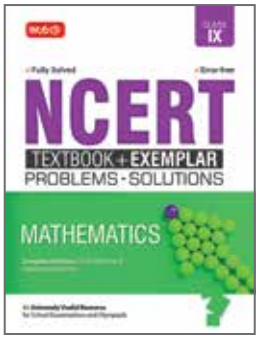
So, value of x should be 25.

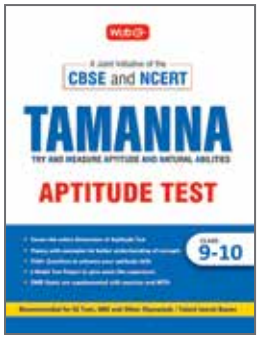
mtG BEST SELLING BOOKS FOR CLASS 9

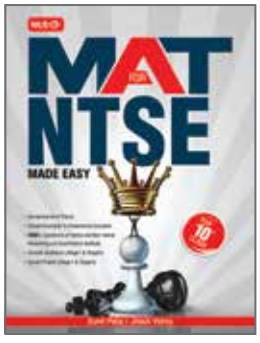


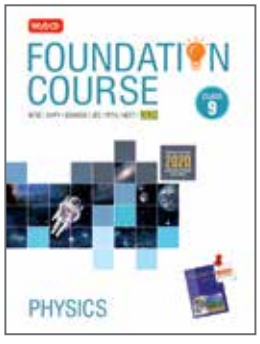


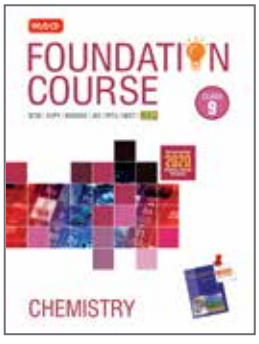


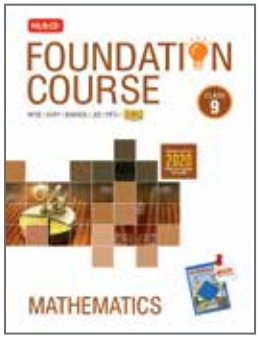


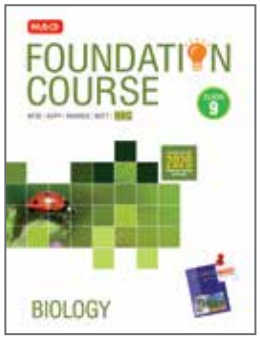


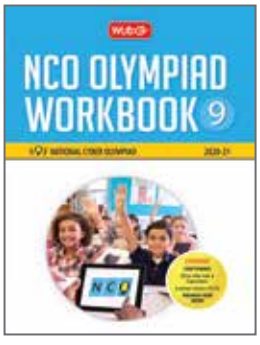


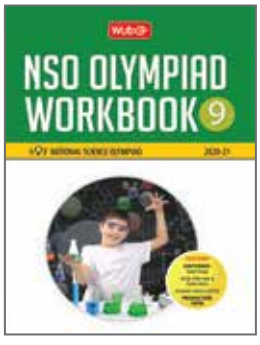


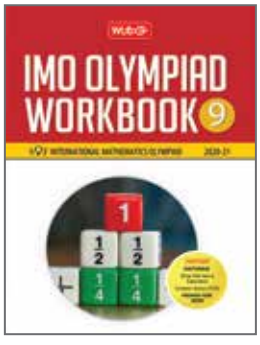


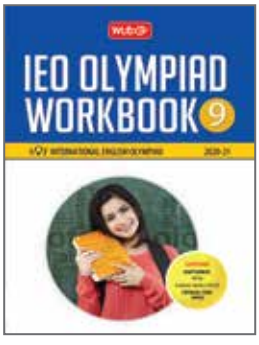


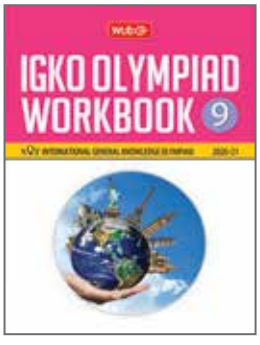


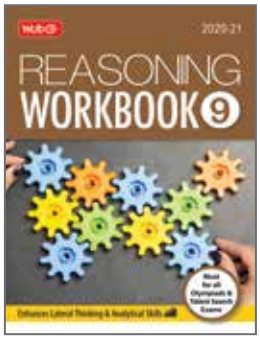












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