Exercise 14.2

Q4. The following distribution gives the state-wise teacher-student ratio in higher secondary schools of India. Find the mode and mean of this data. Interpret the two measures.

No. of students per teacher	Number of states / U.T.
15 – 20	3
20 – 25	8
25 – 30	9
30 – 35	10
35 – 40	3
40 – 45	0
45 – 50	0
50 – 55	2

Ans. For Mode: Here, Maximum frequency is 10 and it corresponds to the class interval 30 – 35.

$\therefore$ Modal class = 30 – 35

And $l = 30, f_1 = 10, f_0 = 9, f_2 = 3$ and $h = 5$

$\because$ Mode $= l + \left(\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$ =

$$30 + \left[\frac{10-9}{2(10)-9-3} \right] \times 5$$

$$= 30 + \frac{1}{20-12} \times 5 \quad = 30 + \frac{5}{8} \quad = 30 + 0.625 = 30.63$$

(approx.)

For Mean:

Expenditure (in Rs.)	No. of families (f_i)	Class Marks (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
15 - 20	3	17.5	- 3	- 9
20 - 25	8	22.5	- 2	- 16
25 - 30	9	27.5	- 1	- 9
30 - 35	10	32.5	0	0
35 - 40	3	37.5	1	3
40 - 45	0	42.5	2	0
45 - 50	0	47.5	3	0
50 - 55	2	52.5	4	8
	$\sum f_i = 35$			$\sum f_i u_i = -23$

From given data, Assume mean (a) $= 32.5$, Width of the class (h) $= 5$

$$\therefore \quad \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{-23}{35} = -0.65$$

Using formula, Mean $\left(\bar{x}\right) = a + h\bar{u}$ $= 32.5 + 5$ (– 0.65) = 32.5 – 3.25 = 29.25 (approx.)

Hence mode and mean of given data is 30.63 and 29.25. Also from above discussion, it is clear that states/U.T. have students per teacher is 30.63 and on average, this ratio is 29.25.

Q5. The given distribution shows the number of runs scored by some top batsmen of the world in one-day cricket matches:

Runs scored	Number of batsmen
3000 – 4000	4
4000 – 5000	18
5000 – 6000	9
6000 – 7000	7
7000 – 8000	6
8000 – 9000	3
9000 – 10000	1
10000 – 11000	1

Find mode of the data.

Ans. In the given data, maximum frequency is 18 and it corresponds to the class interval 4000 – 5000.

$\therefore$ Modal class = 4000 – 5000

And $l = 4000, f_1 = 18, f_0 = 4, f_2 = 9$ and $h = 1000$

$\because$ Mode $= l + \left(\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$

$= 4000 + \left[\dfrac{18 - 4}{2(18) - 4 - 9} \right] \times 1000$

$= 4000 + \dfrac{14}{36 - 13} \times 1000$

$= 4000 + \dfrac{14000}{23}$

$= 4000 + 608.6956$

$= 4608.7$ (approx.)

Hence, mode of the given data is 4608.7 runs.

Q6. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized it in the table given below:

Number of cars	Frequency
0 – 10	7
10 – 20	14
20 – 30	13
30 – 40	12
40 – 50	20
50 – 60	11
60 – 70	15
70 – 80	8

Find the mode of the data.

Ans. In the given data, maximum frequency is 20 and it corresponds to the class interval 40 – 50.

$\therefore$ Modal class = 40 – 50

And $l = 40, f_1 = 20, f_0 = 12, f_2 = 11$ and $h = 10$

$\because$ Mode $= l + \left(\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$

$= 40 + \left[\dfrac{20 - 12}{2(20) - 12 - 11} \right] \times 10$

$= 40 + \dfrac{8}{40 - 23} \times 10$

$= 40 + \dfrac{80}{17} = 40 + 4.70588 = 44.7$ (approx.)

Hence, mode of the given data is 44.7 cars.

********** END **********