CLASS 10 · MATHEMATICS · CHAPTER 13

Statistics - Exercise 13.3

Exercise 13.3 with independently verified solutions.

CHAPTER	RESOURCE	SOURCE
Statistics	NCERT Exercises	NCERT Mathematics, Reprint 2026-27

PART 1

Verified NCERT questions and solutions

Verified NCERT questions and solutions

Solutions are checked independently and follow the supplied NCERT chapter edition.

QUESTION

Question 1

median mean mode · electricity consumption

The monthly electricity consumption of 68 consumers is distributed below. Find the median, mean and mode, then compare them.

Consumption (units)	Consumers
65–85	4
85–105	5
105–125	13
125–145	20
145–165	14
165–185	8
185–205	4

Solution

Board-exam working:

Mean calculation:

Class	f_i	x_i	$f_i x_i$	Cumulative f
65–85	4	75	300	4
85–105	5	95	475	9
105–125	13	115	1495	22
125–145	20	135	2700	42
145–165	14	155	2170	56
165–185	8	175	1400	64
185–205	4	195	780	68

$$\sum f_i = 68, \qquad \sum f_i x_i = 9320$$

$$\bar{x} = \frac{9320}{68} = 137.0588\ldots$$

Median calculation:

$$\frac{n}{2} = 34$$

The first cumulative frequency above 34 is 42, so the median class is 125–145.

$$l = 125, \quad cf = 22, \quad f = 20, \quad h = 20$$

$$\text{Median} = 125 + \frac{34 - 22}{20} \times 20 = 137$$

Mode calculation; the modal class is also 125–145.

$$l = 125, \quad h = 20, \quad f_1 = 20, \quad f_0 = 13, \quad f_2 = 14$$

$$\text{Mode} = 125 + \frac{20 - 13}{2(20) - 13 - 14} \times 20$$

$$= 125 + \frac{140}{13} = 135.7692\ldots$$

Final answer

$$\boxed{\text{Median} = 137; \quad \bar{x} \approx 137.06; \quad \text{Mode} \approx 135.77 \text{ units}}$$

QUESTION

Question 2

median · missing frequencies

The median of the distribution is 28.5. Find x and y.

Class	Frequency
0–10	5
10–20	x
20–30	20
30–40	15
40–50	y
50–60	5
Total	60

Solution

Board-exam working:

From the total frequency:

$$5 + x + 20 + 15 + y + 5 = 60$$

$$x + y = 15 \qquad (1)$$

Since 28.5 lies in 20–30, that is the median class.

$$l = 20, \quad f = 20, \quad cf = 5 + x, \quad h = 10, \quad \frac{n}{2} = 30$$

$$28.5 = 20 + \frac{30 - (5 + x)}{20} \times 10$$

$$8.5 = \frac{25 - x}{2}$$

$$17 = 25 - x \Rightarrow x = 8$$

Use equation (1).

$$8 + y = 15 \Rightarrow y = 7$$

Final answer

$$\boxed{x = 8, \qquad y = 7}$$

QUESTION

Question 3

median age · less-than cumulative frequency

An insurance agent recorded the ages of 100 policy holders. Policies are issued from age 18 to below 60. Calculate the median age.

Age	Policy holders
Below 20	2
Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	92
Below 55	98
Below 60	100

Solution

Board-exam working:

Convert cumulative frequencies to ordinary frequencies by subtraction.

Age class	Frequency	Cumulative frequency
18–20	2	2
20–25	4	6
25–30	18	24
30–35	21	45
35–40	33	78
40–45	11	89
45–50	3	92
50–55	6	98
55–60	2	100

$$n = 100, \qquad \frac{n}{2} = 50$$

The first cumulative frequency above 50 is 78, so the median class is 35–40.

$$l = 35, \quad cf = 45, \quad f = 33, \quad h = 5$$

$$\text{Median} = 35 + \frac{50 - 45}{33} \times 5$$

$$= 35 + \frac{25}{33} = 35.7575\ldots$$

Final answer

$$\boxed{\text{Median age} \approx 35.76 \text{ years}}$$

QUESTION

Question 4

median leaves · continuous classes

The lengths of 40 leaves were measured to the nearest millimetre. Find the median length.

Length (mm)	Leaves
118–126	3
127–135	5
136–144	9
145–153	12
154–162	5
163–171	4
172–180	2

Solution

Board-exam working:

Because measurements are to the nearest millimetre, subtract 0.5 from each lower limit and add 0.5 to each upper limit.

Continuous class	Frequency	Cumulative frequency
117.5–126.5	3	3
126.5–135.5	5	8
135.5–144.5	9	17
144.5–153.5	12	29
153.5–162.5	5	34
162.5–171.5	4	38
171.5–180.5	2	40

$$n = 40, \qquad \frac{n}{2} = 20$$

The median class is 144.5–153.5.

$$l = 144.5, \quad cf = 17, \quad f = 12, \quad h = 9$$

$$\text{Median} = 144.5 + \frac{20 - 17}{12} \times 9$$

$$= 144.5 + 2.25 = 146.75$$

Final answer

$$\boxed{\text{Median leaf length} = 146.75 \text{ mm}}$$

QUESTION

Question 5

median lifetime · neon lamps

The lifetimes of 400 neon lamps are distributed below. Find the median lifetime.

Lifetime (hours)	Lamps
1500–2000	14
2000–2500	56
2500–3000	60
3000–3500	86
3500–4000	74
4000–4500	62
4500–5000	48

Solution

Board-exam working:

Class	Frequency	Cumulative frequency
1500–2000	14	14
2000–2500	56	70
2500–3000	60	130
3000–3500	86	216
3500–4000	74	290
4000–4500	62	352
4500–5000	48	400

$$n = 400, \qquad \frac{n}{2} = 200$$

The first cumulative frequency above 200 is 216, so the median class is 3000–3500.

$$l = 3000, \quad cf = 130, \quad f = 86, \quad h = 500$$

$$\text{Median} = 3000 + \frac{200 - 130}{86} \times 500$$

$$= 3000 + 406.9767\ldots = 3406.9767\ldots$$

Final answer

$$\boxed{\text{Median lifetime} \approx 3406.98 \text{ hours}}$$

QUESTION

Question 6

median mean mode · surname length

The number of letters in 100 surnames is distributed below. Determine the median, mean and modal surname length.

Letters	Surnames
1–4	6
4–7	30
7–10	40
10–13	16
13–16	4
16–19	4

Solution

Board-exam working:

Mean calculation:

Class	f_i	x_i	$f_i x_i$	Cumulative f
1–4	6	2.5	15	6
4–7	30	5.5	165	36
7–10	40	8.5	340	76
10–13	16	11.5	184	92
13–16	4	14.5	58	96
16–19	4	17.5	70	100

$$\bar{x} = \frac{832}{100} = 8.32$$

Median calculation; the median class is 7–10.

$$l = 7, \quad cf = 36, \quad f = 40, \quad h = 3, \quad \frac{n}{2} = 50$$

$$\text{Median} = 7 + \frac{50 - 36}{40} \times 3 = 8.05$$

Mode calculation; the modal class is 7–10.

$$l = 7, \quad h = 3, \quad f_1 = 40, \quad f_0 = 30, \quad f_2 = 16$$

$$\text{Mode} = 7 + \frac{40 - 30}{2(40) - 30 - 16} \times 3$$

$$= 7 + \frac{30}{34} = 7.8823\ldots$$

Final answer

$$\boxed{\text{Median} = 8.05; \quad \bar{x} = 8.32; \quad \text{Mode} \approx 7.88 \text{ letters}}$$

QUESTION

Question 7

median weight · students

The weights of 30 students are distributed below. Find the median weight.

Weight (kg)	Students
40–45	2
45–50	3
50–55	8
55–60	6
60–65	6
65–70	3
70–75	2

Solution

Board-exam working:

Class	Frequency	Cumulative frequency
40–45	2	2
45–50	3	5
50–55	8	13
55–60	6	19
60–65	6	25
65–70	3	28
70–75	2	30

$$n = 30, \qquad \frac{n}{2} = 15$$

The first cumulative frequency above 15 is 19, so the median class is 55–60.

$$l = 55, \quad cf = 13, \quad f = 6, \quad h = 5$$

$$\text{Median} = 55 + \frac{15 - 13}{6} \times 5$$

$$= 55 + \frac{5}{3} = 56.666\ldots$$

Final answer

$$\boxed{\text{Median weight} \approx 56.67 \text{ kg}}$$