



NCERT Solutions For Class 10 Maths Chapter 14 Statistics Exercise 14.2

### Exercise 14.2

**Q1. The following table shows the ages of the patients admitted in a hospital during a year:**

Age (in years)	5 - 15	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65
Number of patients	6	11	21	23	14	5

**Find the mode and the mean of the data given above. Compare and interpret the two measures of central tendency.**

**Ans. For Mode:** In the given data, maximum frequency is 23 and it corresponds to the class interval 35 – 45.

$\therefore$  Modal class = 35 – 45

And  $l = 35, f_1 = 23, f_0 = 21, f_2 = 14$  and  $h = 10$

$$\therefore \text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$= 35 + \left[ \frac{23 - 21}{2(23) - 21 - 14} \right] \times 10$$

$$= 35 + \frac{2}{46 - 35} \times 10$$

$$= 35 + \frac{20}{11}$$

$$= 35 + 1.8$$

$$= 36.8$$

**For Mean:**

Age (in years)	No. of patients ( $f_i$ )	Class Marks ( $x_i$ )	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
5 - 15	6	10	- 2	- 12
15 - 25	11	20	- 1	- 11
25 - 35	21	30	0	0
35 - 45	23	40	1	23
45 - 55	14	50	2	28
45 - 65	5	60	3	15
	$\sum f_i = 80$			$\sum f_i u_i = 43$

From given data, Assume mean ( $a$ ) = 30, Width of the class ( $h$ ) = 10

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{43}{80} = 0.5375$$

Using formula, Mean ( $\bar{x}$ ) =  $a + h\bar{u} = 30 + 10$   
 $(0.5375) = 30 + 5.375 = 35.37$

Hence mode of given data is 36.8 years and mean of the given data is 35.37 years.

Also, it is clear from above discussion that average age of a patient admitted in the hospital is 35.37 years and maximum number of patients admitted in the hospital are of age 36.8 years.

**Q2. The following data gives the information on the observed lifetimes (in hours) of 225 electrical components:**

Life times (in hours)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	10	35	52	61	38	29

**Determine the modal lifetimes of the components.**

**Ans.** Given: Maximum frequency is 61 and it corresponds to the class interval 60 – 80.

$\therefore$  Modal class = 60 – 80

And  $l = 60, f_1 = 61, f_0 = 52, f_2 = 38$  and  $h = 20$

$$\therefore \text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$= 60 + \left[ \frac{61 - 52}{2(61) - 52 - 38} \right] \times 20$$

$$= 60 + \frac{9}{122 - 52 - 38} \times 20$$

$$= 60 + \frac{9}{32} \times 20$$

$$= 60 + 5.625$$

$$= 65.625$$

Hence modal lifetimes of the components is 65.625 hours.

**Q3.** The following data gives the distribution of total monthly household expenditure of 200 families of a village. Find the modal monthly expenditure of the families. Also find the mean monthly expenditure:

Expenditure (in Rs.)	Number of families
1000 – 1500	24
1500 – 2000	40
2000 – 2500	33
2500 – 3000	28
3000 – 3500	30
3500 – 4000	22
4000 – 4500	16
4500 – 5000	7

**Ans. For Mode:** Here, Maximum frequency is 40 and it corresponds to the class interval 1500 – 2000.

$\therefore$  Modal class = 1500 – 2000

And  $l = 1500, f_1 = 40, f_0 = 24, f_2 = 33$  and  $h = 500$

$$\therefore \text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$= 1500 + \left[ \frac{40 - 24}{2(40) - 24 - 33} \right] \times 500$$

$$= 1500 + \frac{16}{80 - 24 - 33} \times 500$$

$$= 1500 + \frac{8000}{23}$$

$$= 1500 + 347.83$$

$$= 1847.83$$

**For Mean:**

Expenditure (in Rs.)	No. of families ( $f_i$ )	Class Marks ( $x_i$ )	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
1000 - 1500	24	1250	- 3	- 72
1500 - 2000	40	1750	- 2	- 80
2000 - 2500	33	2250	- 1	- 33
2500 - 3000	28	2750	0	0
3000 - 3500	30	3250	1	30
3500 - 4000	22	3750	2	44
4000 - 4500	16	4250	3	48
4500 - 5000	7	4750	4	28
	$\sum f_i = 200$			$\sum f_i u_i = -35$

From given data, Assume mean ( $a$ ) = 2750, Width of the class ( $h$ ) = 500

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{-35}{200} = -0.175$$

Using formula, Mean ( $\bar{x}$ ) =  $a + h\bar{u}$  =  $2750 + 500 (-0.175)$  =  $2750 - 87.50$  = 2662.50

Hence the modal monthly expenditure of family is Rs. 1847.83 and the mean monthly expenditure is Rs. 2662.50.

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