

RD SHARMA

Solutions

Class 10 Maths

Chapter 7

Ex 7.4

1. Following are the lives in hours of 15 pieces of the components of aircraft engine. Find the median: 715, 724, 725, 710, 729, 745, 694, 699, 696, 712, 734, 728, 716, 705, 719

Soln:

Lives in hours of is pieces are = 715, 724, 725, 710, 729, 745, 694, 699, 696, 712, 734, 728, 716, 705, 719

Arrange the above data in ascending order = 694, 696, 699, 705, 710, 712, 715, 716, 719, 721, 725, 728, 729, 734, 745

N = 15 (odd)

$$\text{Median} = (N+12)^{\text{th}} \left(\frac{N+1}{2} \right)^{\text{th}} \text{ terms}$$

$$= (15+12)^{\text{th}} \left(\frac{15+1}{2} \right)^{\text{th}} \text{ terms} = 8^{\text{th}} \text{ terms} = 716$$

2. The following is the distribution of height of students of a certain class in a certain city:

Height (in cm):	160-162 168	163-165 169-171	166- 172-174
No of students:	15 142	118 127	18

Find the median height.

Soln:

Class interval (exclusive)	Class interval (inclusive)	Class interval frequency	Cumulative frequency
160 – 162	159.5 – 162.5	15	15
163 – 165	162.5 – 165.5	118	133 (F)
166 – 168	165.5 – 168.5	142 (f)	275
169 – 171	168.5 – 171.5	127	402

172 – 174	171.5 – 174.5	18	420
		N = 420	

We have

$$N = 420$$

$$N/2 = 420/2 = 210$$

The cumulative frequency just greater than $N/2$ is 275 then 165.5 – 168.5 is the median class such, that

$$L = 165.5, f = 142, F = 133 \text{ and } h = 168.5 - 165.5 = 3$$

$$\text{Mean} = L + \frac{N/2 - F}{f} \times h$$

$$\cong 165.5 + 1.63 = 167.13$$

3. Following is the distribution of I.Q of 100 students. Find the median I.Q.

I.Q:	55-64	65-74	75-84	85-94	95-104	105-114
No of students:	1	2	9	22	33	1

Soln:

Class interval (exclusive)	Class interval (inclusive)	Class interval frequency	Cumulative frequency
55 – 64	54.5 – 64.5	1	1
65 – 74	64.5 – 74.5	2	3
75 – 84	74.5 – 84.5	9	12
85 – 94	84.5 – 94.5	22	34 (f)
95 – 104	94.5 – 104.5	33 (f)	67

105 – 114	104.5 – 114.5	22	89
115 – 124	114.5 – 124.5	8	97
125 – 134	124.5 – 134.5	2	99
135 – 144	134.5 – 144.5	1	100
		N = 100	

We have N = 100

$$N/2 = 100/2 = 50$$

The cumulative frequency just greater than N/2 is 67 then the median class is 94.5-104.5 such that

$$L=94.5, F = 33 \quad h = 104.5 - 94.5 = 10$$

$$\text{Mean} = L + \frac{N/2 - F}{f} \times h$$

$$= 94.5 + \frac{50 - 34}{33} \times 10 = 94.5 + 4.88 = 99.35$$

4. Calculate the median from the following data:

Rent (in Rs):	15-25	25-35	35-45	45-55	55-65	65-75
			75-85	85-95		
No of houses:	8	10	15	25	40	
		20	15	7		

Soln:

Class interval	Frequency	Cumulative frequency
15 – 25	8	8
25 – 35	10	18
35 – 45	15	33(f)
45 – 55	25	58

55 – 65	40(f)	28
65 – 75	20	38
75 – 85	15	183
85 – 95	7	140
	N = 140	

We have N = 140

$$N/2 = 140/2 = 70$$

The cumulative frequency just greater than N/2 is 98 then median class is 55 – 65 such that

$$L = 55, f = 40, F = 58, h = 65 - 55 = 10$$

$$\begin{aligned} \text{Mean} &= L + \frac{N/2 - F}{f} \times h \\ &= 55 + \frac{70 - 58}{40} \times 10 = 55 + 3 = 58 \end{aligned}$$

5. Calculate the median from the following data:

Marks below:	10	20	30	40
	50	60	70	80
No of students:	15	35	60	84
	96	127	198	250

Soln:

Marks below	No of students	Class interval	Frequency	Cumulative frequency
10	15	0 – 10	15	15
20	35	10 – 20	20	35
30	60	20 – 30	25	60
40	84	30 – 40	24	84

50	96	40 – 50	12	96(F)
60	127	50 – 60	31 (f)	127
70	198	60 – 70	71	198
80	250	70 – 80	52	250
			N = 250	

We have $N = 250$

$$N/2 = 250/2 = 125$$

The cumulative frequency just greater than $N/2$ is 127 then median class is 50 – 60 such that

$$L = 50, f = 31, F = 96, h = 60 - 50 = 10$$

$$\text{Mean} = L + \frac{N/2 - F}{f} \times h$$

$$= 50 + \frac{125 - 96}{31} \times 10 = 50 + 9.35 = 59.35$$

6. Calculate the missing frequency from the following distribution, it being given that the median of the distribution is 24.

Age in years:	0-10	10-20	20-30	30-40	40-50
No of persons:	5	25	?	18	7

Soln:

Class interval	Frequency	Cumulative frequency
0 – 10	5	5
10 – 20	25	30 (F)
20 – 30	x (f)	30 + x
30 – 40	18	48 + x
40 – 50	7	55 + x
	N = 170	

Given

Median = 24

Then, median class = 20 – 30

$L = 20$, $h = 30 - 20 = 10$, $f = x$, $F = 30$

$$\text{Median} = L + \frac{N - F}{f} \times h$$

$$24 = 20 + \frac{55 + x - 30}{x} \times 10$$

$$24 - 20 = \frac{55 + x - 30}{x} \times 10$$

$$4x = (55 + x - 30) \times 10$$

$$4x = 275 + 5x - 300$$

$$4x - 5x = -25$$

$$-x = -25$$

$$x = 25$$

Missing frequency = 25

7. The following table gives the frequency distribution of married women by age at marriage.

Age (in years)	Frequency	Age (in years)	Frequency
15 – 19	53	40 – 44	9
20 – 24	140	45 – 49	5
25 – 29	98	50 – 54	3
30 – 34	32	55 – 59	3
35 – 39	12	60 and above	2

Calculate the median and interpret the results

Soln:

Class interval (exclusive)	Class interval (inclusive)	Frequency	Cumulative frequency
15 – 19	14.5 – 19.5	53	53 (F)
20 – 24	19.5 – 24.5	140 (f)	193
25 – 29	24.5 – 29.5	98	291
30 – 34	29.5 – 34.5	32	323
35 – 39	34.5 – 39.5	12	335
40 – 44	39.5 – 44.5	9	344
45 – 49	44.5 – 49.5	5	349
50 – 54	49.5 – 54.5	3	352
55 – 54	54.5 – 59.5	3	355
60 and above	59.5 and above	2	357
		N = 357	

$$N = 357$$

$$N/2 = 357/2 = 178.5$$

The cumulative frequency just greater than $N/2$ is 193,

Then the median class is 19.5 – 24.5 such that $l = 19.5$, $f = 140$, $F = 53$, $h = 25.5 - 19.5 = 5$

$$\text{Median} = l + \frac{N/2 - F}{f} \times h$$

$$\text{Median} = 19.5 + \frac{178.5 - 53}{140} \times 5$$

$$\text{Median} = 23.98$$

Nearly half the women were married between the ages of 15 and 25

8. The following table gives the distribution of the life time of 400 neon lamps:

Life time:	Number of lamps

1500 – 2000	14
2000 – 2500	56
2500 – 3000	60
3000 – 3500	86
3500 – 4000	74
4000 – 4500	62
4500 – 5000	48

Find the median life.

Soln: We can find cumulative frequencies with their respective class intervals as below

Life time	Number of lamps f_i	Cumulative frequency (cf)
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
Total (n)	400	

Now we may observe that cumulative frequency just greater than $n/2$ ($400/2 = 200$) is 216 belongs to class interval 3000 – 3500

Median class = 3000 – 3500

Lower limits (l) of median class = 3000

Frequency (f) of median class = 86

Cumulative frequency (cf) of class preceding median class = 130

Class size (h) = 500

$$\text{Median} = l + \left(\frac{\frac{n}{2} - \text{cfc}}{f} \right) \times h$$

$$= 3000 + \left(\frac{200 - 130}{86} \right) \times 500$$

$$= 3000 + (35000 / 86)$$

$$= 3406.98$$

So, median life time of lamps is 3406.98 hours

9. The distribution below gives the weight of 30 students in a class. Find the median weight of students:

Weight (in kg):	40-45	45-50	50-55	55-60	60-65	65-70
No of students:	2	3	8	6	6	2

Soln: We may find cumulative frequency with their respective class intervals as below

Weight (in kg)	Number of students f_i	Cumulative frequency (cf)
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

Cumulative frequency just greater than $n/2$ (i.e. $30/2 = 15$) is 19, belonging to class interval 55 – 60

Median class = 55 – 60

Lower limit (l) of median class = 55

Frequency (f) of median class = 6

Cumulative frequency (cf) = 13

Class size (h) = 5

$$\text{Median} = l + \left(\frac{n_2 - cff}{f} \right) \times h$$

$$= 55 + \left(\frac{15 - 13}{6} \right) \times 5$$

$$= 55 + 10/6$$

$$= 56.666$$

So, median weight is 56.67 kg

10. Find the missing frequencies and the median for the following distribution if the mean is 1.46

No of accidents:	0 3	1 4	2 5	Total
Frequencies (no of days):	46 25	? 10	? 5	200

Soln:

No of accidents (x)	No of days (f)	fx
0	46	0
1	x	x
2	y	2y
3	25	75
4	10	40
5	5	25
	N = 200	Sum = x + 2y + 140

Given

$$N = 200$$

$$46 + x + y + 25 + 10 + 5 = 200$$

$$x + y = 200 - 46 - 25 - 10 - 5$$

$$x + y = 114 \text{ --- (1)}$$

And, Mean = 1.46

$$\text{Sum/ N} = 1.46$$

$$(x + 2y + 140)/ 200 = 1.46$$

$$x + 2y = 292 - 140$$

$$x + 2y = 152 \text{ --- (2)}$$

Subtract equation (1) from equation (2)

$$x + 2y - x - y = 152 - 114$$

$$y = 38$$

Putting the value of y in equation (1), we have $x = 114 - 38 = 76$

No of accidents	No of days	Cumulative frequency
0	46	46
1	76	122
2	38	160
3	25	185
4	10	195
5	5	200
	N = 200	

We have,

$$N = 200$$

$$N/ 2 = 200/ 2 = 100$$

The cumulative frequency just more than $N/ 2$ is 122 then the median is 1

11.An incomplete distribution is given below:

Variable:	10-20	20-30	30-40	40-50	50-60	60-
	70	70-80				

Frequency:	12	30	?	65	?
	25	18			

You are given that the median value is 46 and the total number of items is 230.

(i) Using the median formula fill up the missing frequencies.

(ii) Calculate the AM of the completed distribution.

Soln:

(i)

Class interval	Frequency	Cumulative frequency
10 – 20	12	12
20 – 30	30	42
30 – 40	x	42+ x (F)
40 – 50	65 (f)	107 + x
50 – 60	Y	107 + x + y
60 – 70	25	132 + x + y
70 – 80	18	150 + x + y
	N = 150	

Given

Median = 46

Then, median class = 40 – 50

L = 40, h = 50 – 40 = 10, f = 65, F = 42 + x

$$\text{Median} = L + \frac{N - F}{f} \times h$$

$$46 = 40 + \frac{115 - (42 + x)}{65} \times 10$$

$$46 - 40 = \frac{115 - 42 - x}{65} \times 10$$

$$6 (65 / 10) = 73 - x$$

$$39 = 73 - x$$

$$x = 73 - 39 = 34$$

Given

$$N = 230$$

$$12 + 30 + 34 + 65 + y + 25 + 18 = 230$$

$$184 + y = 230$$

$$Y = 230 - 184$$

$$Y = 46$$

(ii)

Class interval	Mid value x	Frequency f	Fx
10 – 20	15	12	180
20 – 30	25	30	750
30 – 40	35	34	1190
40 – 50	45	65	2925
50 – 60	55	46	2530
60 – 70	65	25	1625
70 – 80	75	18	1350
		N = 230	$\Sigma fx = 10550$

$$\text{Mean} = \frac{\Sigma fx}{N}$$

$$= 10550 / 230 = 45.87$$

12.If the median of the following frequency distribution is 28.5 find the missing frequencies:

Class interval:	0-10 40	10-20 40-50	20-30 50-60	30-	Total
Frequency:	5 15	f_1 f_2	20 5		60

Soln:

Class interval	Frequency	Cumulative frequency
0 – 10	5	5
10 – 20	f_1	$5 + f_1$ (F)
20 – 30	20 (f)	$25 + f_1$
30 – 40	15	$40 + f_1$
40 – 50	f_2	$40 + f_1 + f_2$
	$N = 60$	

Given

Median = 28.5

Then, median class = 20 – 30

$$\text{Median} = l + \frac{\frac{N}{2} - F}{f} \times h$$

$$28.5 = 20 + \frac{30 - (5 + f_1)}{20} \times 10$$

$$28.5 - 20 = \frac{30 - 5 - f_1}{20} \times 10$$

$$8.5 = \frac{25 - f_1}{2}$$

$$17 = 25 - f_1$$

$$f_1 = 25 - 17 = 8$$

Given

Sum of frequencies = 60

$$5 + f_1 + 20 + 15 + f_2 + 5 = 60$$

$$5 + 8 + 20 + 15 + f_2 + 5 = 60$$

$$f_2 = 7$$

$$f_1 = 8 \text{ and } f_2 = 7$$

13. The median of the following data is 525. Find the missing frequency, if it is given that there are 100 observations in the data.

Class interval	Frequency	Class interval	Frequency
0 – 100	2	500 – 600	20
100 – 200	5	600 – 700	f_2
200 – 300	f_1	700 – 800	9
300 – 400	12	800 – 900	7
400 – 500	17	900 – 1000	4

Soln:

Class interval	Frequency	Cumulative frequency
0 – 100	2	2
100 – 200	5	7
200 – 300	f_1	$7 + f_1$
300 – 400	12	$19 + f_1$
400 – 500	17	$36 + f_1$ (F)
500 – 600	20 (f)	$56 + f_1$
600 – 700	f_2	$56 + f_1 + f_2$
700 – 800	9	$65 + f_1 + f_2$
800 – 900	7	$72 + f_1 + f_2$
900 – 1000	4	$76 + f_1 + f_2$
	N = 100	

Given

Median = 525

Then, median class = 500 – 600

$$L = 500, f = 20, F = 36 + f_1, h = 600 - 500 = 100$$

$$\text{Median} = L + \frac{N - F}{f} \times h$$

$$525 = 500 + \frac{50 - (36 + f_1)}{20} \times 100$$

$$525 = 500 + \frac{50 - 36 - f_1}{20} \times 100$$

$$25 = (14 - f_1) \times 5$$

$$5 = 14 - f_1$$

$$f_1 = 14 - 5 = 9$$

Given

Sum of frequencies = 100

$$2 + 5 + f_1 + 12 + 17 + 20 + f_2 + 9 + 7 + 4 = 100$$

$$2 + 5 + 9 + 12 + 17 + 20 + f_2 + 9 + 7 + 4 = 100$$

$$85 + f_2 = 100$$

$$f_2 = 100 - 85 = 15$$

$$f_1 = 9 \text{ and } f_2 = 15$$

14. If the median of the following data is 32.5, find the missing frequencies.

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

Soln:

Class interval	Frequency	Cumulative frequency
0 - 10	f_1	f_1
10 - 20	5	$5 + f_1$

20 – 30	9	$14 + f_1$
30 – 40	12 (f)	$26 + f_1$
40 – 50	f_2	$26 + f_1 + f_2$
50 – 60	3	$29 + f_1 + f_2$
60 – 70	2	$31 + f_1 + f_2$
	$N = 40$	

Given

$$\text{Median} = 32.5$$

The median class = 30 – 40

$$L = 30, h = 40 - 30 = 10, f = 12, F = 14 + f_1$$

$$\text{Median} = L + \frac{N - F}{f} \times h$$

$$32.5 = 30 + \frac{40 - (14 + f_1)}{12} \times 10$$

$$32.5 - 30 = \frac{26 - (14 + f_1)}{12} \times 10$$

$$2.5 (12) = (6 - f_1) \times 10$$

$$30 = (6 - f_1) \times 10$$

$$3 = 6 - f_1$$

$$f_1 = 6 - 3 = 3$$

Given

Sum of frequencies = 40

$$f_1 + 5 + 9 + 12 + f_2 + 3 + 2 = 40$$

$$3 + 5 + 9 + 12 + f_2 + 3 + 2 = 40$$

$$34 + f_2 = 40$$

$$f_2 = 40 - 34 = 6$$

$$f_1 = 3 \text{ and } f_2 = 6$$

15. Compute the median for each of the following data

(i)		(ii)	
Marks	No of students	Marks	No of students
Less than 10	0	More than 80	150
Less than 30	10	More than 90	141
Less than 50	25	More than 100	124
Less than 70	43	More than 110	105
Less than 90	65	More than 120	60
Less than 110	87	More than 130	27
Less than 130	96	More than 140	12
Less than 150	100	More than 150	0

Soln:(i)

Marks	No of students	Class interval	Frequency	Cumulative frequency
Less than 10	0	0 – 10	0	0
Less than 30	10	10 – 30	10	10
Less than 50	25	30 – 50	15	25
Less than 70	43	50 – 70	18	43 (F)
Less than 90	65	70 – 90	22 (f)	65
Less	87	90 – 110	22	87

than 110				
Less than 130	96	110 – 130	9	96
Less than 150	100	130 – 150	4	100
			N = 100	

We have

$$N = 100$$

$$N/2 = 100/2 = 50$$

The cumulative frequency just greater than $N/2$ is 65 then median class is 70 – 90 such that

$$L = 70, h = 90 - 70 = 20, f = 22, F = 43$$

$$\text{Median} = L + \frac{N/2 - F}{f} \times h$$

$$= 70 + \frac{50 - 43}{22} \times 20$$

$$= 70 + \frac{7 \times 20}{22}$$

$$= 70 + 6.36$$

$$= 76.36$$

(ii)

Marks	No of students	Class interval	Frequency	Cumulative frequency
More than 80	150	80 – 90	9	9
More than 90	141	90 – 100	17	26
More than 100	124	100 – 110	19	45 (F)
More than 110	105	110 – 120	45 (f)	90
More than 120	60	120 – 130	33	123
More than 130	27	130 – 140	15	138

More than 140	12	140 – 150	12	150
More than 150	0	150 – 160	0	150
			N = 150	

We have

$$N = 150$$

$$N/2 = 150/2 = 75$$

The cumulative frequency just more than $N/2$ is 90 then the median class is 110 – 120 such that

$$L = 70, h = 120 - 110 = 10, f = 45, F = 45$$

$$\text{Median} = L + \frac{N/2 - F}{f} \times h$$

$$= 110 + \frac{75 - 45}{45} \times 10$$

$$= 110 + \frac{30 \times 10}{45}$$

$$= 110 + 6.67$$

$$= 116.67$$

16.A survey regarding the height (in cm) of 51 girls of class X of a school was conducted and the following data was obtained:

Height in cm	number of girls
Less than 140	4
Less than 145	11
Less than 150	29
Less than 155	40
Less than 160	46
Less than 165	51

Find the median height.

Soln: To calculate the median height, we need to find the class intervals and their corresponding frequencies.

The given distribution being of the less than type, 140, 145, 150, 155, 160, 165 give the upper limits of the corresponding class intervals. So, the classes should be below 140, 140-145, 145-150, 150-155, 155-160, 160-165. Observe that from the given distribution, we find that there are 4 girls with height less than 140, i.e. the frequency of class interval below 140 is 4. Now, there are 11 girls with heights less than 145 and 4 girls with height less than 140. Therefore, the number of girls with height in the interval 140 – 145 is $11 - 4 = 7$. Similarly, the frequency of 145 – 150 is $29 - 11 = 18$, for 150 – 155, it is $40 - 29 = 11$, and so on. So, our frequency distribution table with given cumulative frequencies becomes:

Class interval	Frequency	Cumulative frequency
Below 140	4	4
140 – 145	7	11
145 – 150	18	29
150 – 155	11	40
155 – 160	6	46
160 – 165	5	51

Now $n = 51$. So, $n/2 = 51/2 = 25.5$ this observation lies in the class 145 – 150

Then,

L (the lower limit) = 145

cf (the cumulative frequency of the class preceding 145 – 150) = 11

f (the frequency of the median class 145 – 150) = 18

h (the class size) = 5

Using the formula, median = $L + \left(\frac{\frac{n}{2} - cf}{f} \right) \times h$, we have

Median = Missing close brace Missing close brace

= $145 + 72.5/18 = 149.03$

So, the median height of the girls is 149.03 cm

This means that the height of about 50% of the girls is less than this height, and 50% are taller than this height.

17. A life insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are only given to persons having age 18 years onwards but less than 60 years.

Ages in years	Number of 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

Soln: Here class width is not same. There is no need to adjust the frequencies according to class interval. Now given frequencies table is less type represented with upper class limits. As policies were given only to persons having age 18 years onwards but less than 60 years we can define class intervals with their respective cumulative frequency as below.

Age (in years)	Number of policy holders f_i	Cumulative frequency (cf)
18 – 20	2	2
20 – 25	$6 - 2 = 4$	6
25 – 30	$24 - 6 = 18$	24
30 – 35	$45 - 24 = 21$	45
35 – 40	$78 - 45 = 33$	78
40 – 45	$89 - 78 = 11$	89
45 – 50	$92 - 89 = 3$	92
50 – 55	$98 - 92 = 6$	98

55 – 60	100 – 98 = 2	100
Total		

Now from table we may observe that $n = 100$

Cumulative frequency (cf) just greater than $n/2$ (i.e. $100/2 = 50$) is 78 belonging to interval 35 – 40

So median class = 35 – 40

Lower limit (l) of median class = 35

Class size (h) = 5

Frequency (f) of median class = 33

Cumulative frequency (cf) of class preceding median class = 45

$$\text{Median} = l + \left(\frac{\frac{n}{2} - \text{cf}}{f} \right) \times h$$

$$= 35 + \left(\frac{50 - 45}{33} \right) \times 5$$

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

$$= 35.76$$

So median age is 35.76 years

18. The lengths of 40 leaves of a plant are measured correct to the nearest millimeter, and the data obtained is represented in the following table:

Length (in mm)	No of leaves
118 – 126	3
127 – 135	5
136 – 144	9
145 – 153	12
154 – 162	5
163 – 171	4
172 – 180	2

Find the mean length of life

Soln: The given data is not having continuous class intervals. We can observe the difference between two class intervals is 1. So we have to add and subtract

$1/2 = 0.5$ to upper class limits and lower class limits

Now continuous class intervals with respective cumulative frequencies can be represented as below:

Length (in mm)	Number of leaves f_i	Cumulative frequency (cf)
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

From the table we may observe that cumulative frequency just greater than $n/2$ (i.e. $40/2 = 20$) is 29, belongs to class interval 144.5 – 153.5

Median class = 144.5 – 153.5

Lower limit (l) = 144.5

Class size (h) = 9

Frequency (f) of median class = 12

Cumulative frequency (cf) of class preceding median class = 17

$$\text{Median} = l + \left(\frac{\frac{n}{2} - \text{cf}}{f} \right) \times h$$

$$= 144.5 + \left(\frac{20 - 17}{12} \right) \times 9$$

$$= 144.5 + 9/4 = 146.75$$

So median length of leaves is 146.75mm

19. An incomplete distribution is given as follows:

Variable:	0-10 60	10-20 60-70	20-30	30-40	40-50	50- 60
Frequency:	10 ?	20 25	? 15	40		

You are given that the median value is 35 and sum of all the frequencies are 170. Using the median formula, fill up the missing frequencies

Soln:

Class interval	Frequency	Cumulative frequency
0 – 10	10	10
10 – 20	20	30
20 – 30	f_1	$30 + f_1$ (F)
30 – 40	40 (F)	$70 + f_1$
40 – 50	f_2	$70 + f_1 + f_2$
50 – 60	25	$95 + f_1 + f_2$
60 – 70	15	$110 + f_1 + f_2$
	$N = 170$	

Given

Median = 35

Then median class = 30 – 40

$L = 30$, $h = 40 - 30 = 10$, $f = 40$, $F = 30 + f_1$

$$\text{Median} = L + \frac{N - F}{f} \times h$$

$$35 = 30 + \frac{170 - (30 + f_1)}{40} \times 10$$

$$35 - 30 = \frac{170 - 30 - f_1}{40} \times 10$$

$$5 = \frac{140 - f_1}{4}$$

$$20 = 55 - f_1$$

$$f_1 = 55 - 20 = 35$$

Given

Sum of frequencies = 170

$$10 + 20 + f_1 + 40 + f_2 + 25 + 15 = 170$$

$$10 + 20 + 35 + 40 + f_2 + 25 + 15 = 170$$

$$f_2 = 25$$

$$f_1 = 35 \text{ and } f_2 = 25$$