Exercise 24(C)

A student got the following marks in 9 questions of a question paper. 3, 5, 7, 3, 8, 0, 1, 4 and 6. Find the median of these marks.
Solution:

Arranging the given data in descending order:
8, 7, 6, 5, 4, 3, 3, 1, 0
Clearly, the middle term is 4 which is the 5^{th} term.
Hence, median = 4

1. The weights (in kg) of 10 students of a class are given below:
21, 28.5, 20.5, 24, 25.5, 22, 27.5, 28, 21 and 24.
Find the median of their weights.
Solution:

Arranging the given data in descending order:
28.5, 28, 27.5, 25.5, 24, 24, 22, 21, 21, 20.5
It's seen that,
The middle terms are 24 and 24, 5^{th} and 6^{th} terms
Thus,
Median = (24 + 24)/ 2 = 48/2 = 24

2. The marks obtained by 19 students of a class are given below:
27, 36, 22, 31, 25, 26, 33, 24, 37, 32, 29, 28, 36, 35, 27, 26, 32, 35 and 28. Find:
(i) median **(ii) lower quartile**
(iii) upper quartile **(iv) interquartile range**
Solution:

Arranging in ascending order:
22, 24, 25, 26, 26, 27, 27, 28, 28, 29, 21, 32, 32, 33, 35, 35, 36, 36, 37

(i) The middle term is 10^{th} term i.e. 29
Hence, median = 29

(ii) Lower quartile

$$q_1 = \frac{n+1^{th}}{4} \text{ term}$$

$$q_1 = \frac{19+1^{th}}{4} \text{ term}$$

$$q_1 = 5^{th}\text{term} = 26$$

(iii) Upper quartile =

$$q_3 = \left[\frac{3(n+1)}{4}\right]^{th} \text{ term}$$

$$q_3 = \left[\frac{3(19+1)}{4}\right]^{th} \text{ term}$$

$$q_3 = 15^{th} \text{term} = 35$$

(iv) Interquartile range = $q_3 - q_1 = 35 - 26 = 9$

3. From the following data, find:
(i) Median
(ii) Upper quartile
(iii) Inter-quartile range
25, 10, 40, 88, 45, 60, 77, 36, 18, 95, 56, 65, 7, 0, 38 and 83
Solution:

Arranging the given data in ascending order, we have:
0, 7, 10, 18, 25, 36, 38, 40, 45, 56, 60, 65, 77, 83, 88, 95
(i) Median is the mean of 8^{th} and 9^{th} term
Thus, median = (40 + 45)/ 2 = 85/2 = 42.5

(ii) Upper quartile =

$$q_3 = \left(\frac{3(n)}{4}\right)^{th} \text{ term}$$

$$q_3 = \frac{3 \times 16^{th}}{4} \text{ term} = 12^{th} \text{term} = 65$$

(iii) Interquartile range is given by,
$q_1 = 16^{th}/4$ term = 18; $q_3 = 65$
Interquartile range = $q_3 - q_1$
Thus,
$q_3 - q_1 = 65 - 18 = 47$

4. The ages of 37 students in a class are given in the following table:

Age (in years)	**11**	**12**	**13**	**14**	**15**	**16**
Frequency	**2**	**4**	**6**	**10**	**8**	**7**

Find the median.
Solution:

Age (in years)	Frequency	Cumulative Frequency
11	2	2
12	4	6
13	6	12
14	10	22
15	8	30

16	7	37

Number of terms (n) = 37

Median = $\frac{37+1^{th}}{2}$ term = 19^{th} term

And, the 19^{th} term is 14

Therefore, the median = 14