Solution 1: **Exercise 19(B)**

(i)Firstly arrange the numbers in ascending order

$16, 16, 19, 25, 26, 28, 31, 32, 35$

Now since

n=9(odd)

Therefore Median

$$= \left(\frac{n+1}{2}\right)^{th}$$

$$= \left(\frac{9+1}{2}\right)^{th}$$

$$= 5^{th}$$

Thus the median is 26

(ii)

Firstly arrange the numbers in ascending order

241, 243, 257, 258, 261, 271, 292, 299, 327, 347, 350

Now since n=11(Odd)

$$\text{Median} = \text{value of} \left(\frac{n+1}{2}\right)^{th} \text{term}$$

$$= 6^{th}\text{term}$$

$$= 271$$

Thus median is 271.

(iii) Firstly arrange the numbers in ascending order

$9, 14, 17, 21, 25, 34, 43, 50, 50, 63$

Now since n=10(even)

$$\text{Median} = \frac{1}{2}\left[\text{value of } \left(\frac{n}{2}\right)^{th} \text{ term} + \text{value of } \left(\frac{n}{2}+1\right)^{th} \text{ term}\right]$$

$$= \frac{1}{2}\left[\text{value of } \left(\frac{10}{2}\right)^{th} \text{ term} + \text{value of } \left(\frac{10}{2}+1\right)^{th} \text{ term}\right]$$

$$= \frac{1}{2}[25+34]$$

$$= \frac{1}{2}[59]$$

$$= 29.5$$

Thus the median is 29.5

(iv) Firstly arrange the numbers in ascending order

173,185,189,194,194,200,204,208,220,223

$$\text{Median} = \frac{1}{2}\left[\text{value of } \left(\frac{n}{2}\right)^{th} \text{ term} + \text{value of } \left(\frac{n}{2}+1\right)^{th} \text{ term}\right]$$

$$= \frac{1}{2}\left[\text{value of } \left(\frac{10}{2}\right)^{th} \text{ term} + \text{value of } \left(\frac{10}{2}+1\right)^{th} \text{ term}\right]$$

$$= \frac{1}{2}[200+194]$$

$$= \frac{1}{2}[394]$$

$$= 197$$

Thus the median is 197

Solution 2:

Given numbers are 34, 37, 53, 55, x, x+2, 77, 83, 89, 100

Here n = 10(even)

$$Median = \frac{1}{2}\left[value\ of\left(\frac{n}{2}\right)^{th} term + value\ of\left(\frac{n}{2}+1\right)^{th} term\right]$$

$$= \frac{1}{2}\left[value\ of\left(\frac{10}{2}\right)^{th} term + value\ of\left(\frac{10}{2}+1\right)^{th} term\right]$$

$$= \frac{1}{2}[value\ of\ (5)^{th} term + value\ of\ (5+1)^{th} term]$$

$$= \frac{1}{2}[value\ of\ (5)^{th} term + value\ of\ (6)^{th} term]$$

$$63 = \frac{1}{2}[x + x + 2]$$

$$\Rightarrow \frac{[2+2x]}{2} = 63$$

$$\Rightarrow x + 1 = 63$$

$$\Rightarrow x = 62$$

Solution 3:

For any given set of data, the median is the value of its middle term.

Here, total observations = n = 10 (even)

If n is even, we have

$$\text{Median} = \frac{1}{2}\left[\text{value of}\left(\frac{n}{2}\right)^{\text{th}}\ \text{term} + \text{value of}\left(\frac{n}{2}+1\right)^{\text{th}}\ \text{term}\right]$$

Thus, for n = 10, we have

$$\text{Median} = \frac{1}{2}\left[\text{value of}\left(\frac{10}{2}\right)^{\text{th}}\ \text{term} + \text{value of}\left(\frac{10}{2}+1\right)^{\text{th}}\ \text{term}\right]$$

$$= \frac{1}{2}\left[\text{value of } 5^{\text{th}}\ \text{term} + \text{value of } 6^{\text{th}}\ \text{term}\right]$$

Hence, if 7^{th} number is diminished by 8, there is no change in the median value.

Solution 4:

Here, total observations = n = 10 (even)

Thus, we have

$$\text{Median} = \frac{1}{2}\left[\text{value of } \left(\frac{10}{2}\right)^{th} \text{ term} + \text{value of } \left(\frac{10}{2}+1\right)^{th} \text{ term}\right]$$

$$= \frac{1}{2}\left[\text{value of } 5^{th} \text{ term} + \text{value of } 6^{th} \text{ term}\right]$$

According to given information, data in ascending order is as follows:

	1st Term	2nd Term	3rd Term	4th Term	5th Term	6th Term	7th Term	8th Term	9th Term	10th Term
Marks	Less than 30			35	40	48	66	More than 75		

$$\therefore \text{Median} = \frac{1}{2}(40+48) = \frac{88}{2} = 44$$

Hence, the median score of the whole group is 44.

Solution 5:

Total number of observations = 9 (odd)

Now, if n = odd

$$\text{Median} = \left(\frac{n+1}{2}\right)^{th} \text{ term}$$

$$\Rightarrow \text{Median} = \left(\frac{9+1}{2}\right)^{th} \text{ term} = 5^{th} \text{ term} = x+5$$

Now, Median = 18 (given)

$\therefore x+5=18$

$\Rightarrow x=13$