

RD SHARMA

Solutions

Class 7 Maths

Chapter 23

Ex 23.3

Find the median of the following data (1-8)

Q1) 83, 37, 70, 29, 45, 63, 41, 70, 34, 54

Solution:

Arranging the data in ascending order, we have:

29, 34, 37, 41, 45, 54, 63, 70, 70, 83

Here, the number of observations, $n = 10$ (Even).

$$\Rightarrow \text{Median} = \frac{n}{2} \text{th observation} + \frac{n}{2} + 1 \text{th observation}$$

$$\Rightarrow \text{Median} = \frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2}$$

$$\Rightarrow \text{Median} = \frac{45+54}{2} = 49.5$$

Hence, the median of the given data is 49.5.

Q2) 133, 73, 89, 108, 94, 104, 94, 85, 100, 120

Solution:

Arranging the data in ascending order, we have:

73, 85, 89, 94, 100, 104, 108, 120, 133

Here, the number of observations, $n = 10$ (Even)

$$\Rightarrow \text{Median} = \frac{n}{2} \text{th observation} + \frac{n}{2} + 1 \text{th observation}$$

$$\Rightarrow \text{Median} = \frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2}$$

$$\Rightarrow \text{Median} = \frac{94+100}{2} = 97$$

Hence, the median of the given data is 97.

Q3) 31, 38, 27, 28, 36, 25, 35, 40

Solution:

Arranging the data in ascending order, we have:

25, 27, 28, 31, 35, 36, 38, 40

Here, the number of observations, $n = 8$ (Even).

$$\Rightarrow \text{Median} = \frac{n}{2} \text{th observation} + \frac{n}{2} + 1 \text{th observation}$$

$$\Rightarrow \text{Median} = \frac{\text{Value of 4th observation} + \text{Value of 5th observation}}{2}$$

$$\Rightarrow \text{Median} = \frac{31+35}{2} = 33$$

Hence, the median of the given data is 33.

Q4) 15, 6, 16, 8, 22, 21, 9, 18, 25

Solution:

Arranging the data in ascending order, we have:

6, 8, 9, 15, 16, 18, 21, 22, 25

Here, the number of observations, $n = 9$ (Odd).

$$\Rightarrow \text{Median} = \text{Value of } \frac{n+1}{2} \text{th observation i.e., value of 5th observation} = 16$$

Hence, the median of the given data is 16.

Q5) 41, 43, 127, 99, 71, 92, 71, 58, 57

Solution:

Arranging the data in ascending order, we have:

41, 43, 57, 58, 71, 71, 92, 99, 127

Here, the number of observations, $n = 9$ (Odd).

\therefore Median = Value of $\frac{9+1}{2}$ th observation i.e., the 5th observation = 71.

Q6) 25, 34, 31, 23, 22, 26, 35, 29, 20, 32

Solution:

Arranging the data in ascending order, we have:

20, 22, 23, 25, 26, 29, 31, 32, 34, 35

Here, the number of observations, $n = 10$ (Even).

\Rightarrow Median = $\frac{n}{2}$ th observation + $\frac{n}{2} + 1$ th observation

\Rightarrow Median = $\frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2}$

\Rightarrow Median = $\frac{26+29}{2} = 27.5$

Hence, the median of the given data is 27.5.

Q7) 12, 17, 3, 14, 5, 8, 7, 15

Solution:

Arranging the data in ascending order, we have:

3, 5, 7, 8, 12, 14, 15, 17

Here, the number of observations, $n = 8$ (Even).

\Rightarrow Median = $\frac{n}{2}$ th observation + $\frac{n}{2} + 1$ th observation

\Rightarrow Median = $\frac{\text{Value of 4th observation} + \text{Value of 5th observation}}{2}$

\Rightarrow Median = $\frac{8+12}{2} = 10$

Hence, the median of the given data is 10.

Q8) 92, 35, 67, 85, 72, 81, 56, 51, 42, 69

Solution:

Arranging the data in ascending order, we have:

35, 42, 51, 56, 67, 69, 72, 81, 85, 92

Here, the number of observations, $n = 10$ (Even).

\Rightarrow Median = $\frac{n}{2}$ th observation + $\frac{n}{2} + 1$ th observation

\Rightarrow Median = $\frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2}$

\Rightarrow Median = $\frac{67+69}{2} = 68$

Hence, the median of the given data is 68.

Q9) Numbers 50, 42, 35, $2x + 10$, $2x - 8$, 12, 11, 8, 6 are written in descending order and their median is 25, find x .

Solution:

Here, the number of observations n is 9. Since n is odd, the median is the $\frac{n+1}{2}$ th observation, i.e., the 5th observation.

As the numbers are arranged in the descending order, we therefore observe from the last.

Median = 5th observation.

$\Rightarrow 25 = 2x - 8$

$\Rightarrow 2x = 25 + 8$

$\Rightarrow 2x = 33$

$\Rightarrow x = \frac{33}{2}$

$\Rightarrow x = 16.5$

Hence, $x = 16.5$.

Q10) Find the median of the following observations: 46, 64, 87, 41, 58, 77, 35, 90, 55, 92, 33. If 92 is replaced by 99 and 41 by 43 in the above data, find the new median?

Solution:

Arranging the given data in ascending order, we have:

33, 35, 41, 46, 55, 58, 64, 77, 87, 90, 92

Here, the number of observations n is 11 (odd).

Since the number of observations is odd, therefore,

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 6th observation = 58.

Hence, median = 58.

If 92 is replaced by 99 and 41 by 43, then the new observations arranged in ascending order are:

33, 35, 43, 46, 55, 58, 64, 77, 87, 90, 99

\therefore New median = Value of the 6th observation = 58.

Q11) Find the median of the following data: 41, 43, 127, 99, 61, 92, 71, 58, 57. If 58 is replaced by 85, what will be the new median?

Solution:

Arranging the given data in ascending order, we have:

41, 43, 57, 58, 61, 71, 92, 99, 127

Here, the number of observations, n , is 9 (odd).

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 5th observation = 61.

Hence, the median = 61.

If 58 is replaced by 85, then the new observations arranged in ascending order are:

41, 43, 57, 61, 71, 85, 92, 99, 127

New median = Value of the 5th observation = 71.

Q12) The weights (in kg) of 15 students are: 31, 35, 27, 29, 32, 43, 37, 41, 34, 28, 36, 44, 45, 42, 30. Find the median. If the weight 44 kg is replaced by 46 kg and 27 kg by 25 kg, find the new median.

Solution:

Arranging the given data in ascending order, we have:

27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 44, 45

Here, the number of observations n is 15 (odd).

Since the number of observations is odd, therefore,

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 8th observation = 35.

Hence, median = 35 kg.

If 44 kg is replaced by 46 kg and 27 kg by 25 kg, then the new observations arranged in ascending order are:

25, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 45, 46

\therefore New median = Value of the 8th observation = 35 kg.

Q13) The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x : 29, 32, 48, 50, x , $x+2$, 72, 78, 84, 95

Solution:

Here, the number of observations n is 10. Since n is even,

\Rightarrow Median = $\frac{n}{2}$ th observation + $\frac{n}{2} + 1$ th observation

\Rightarrow Median = $\frac{\text{Value of 5th observation} + \text{Value of 6th observation}}{2}$

$\Rightarrow 63 = \frac{x+(x+2)}{2}$

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

$$\Rightarrow 63 = \frac{2(x+1)}{2}$$

$$\Rightarrow 63 = x + 1 \Rightarrow x = 63 - 1 \Rightarrow x = 62.$$