

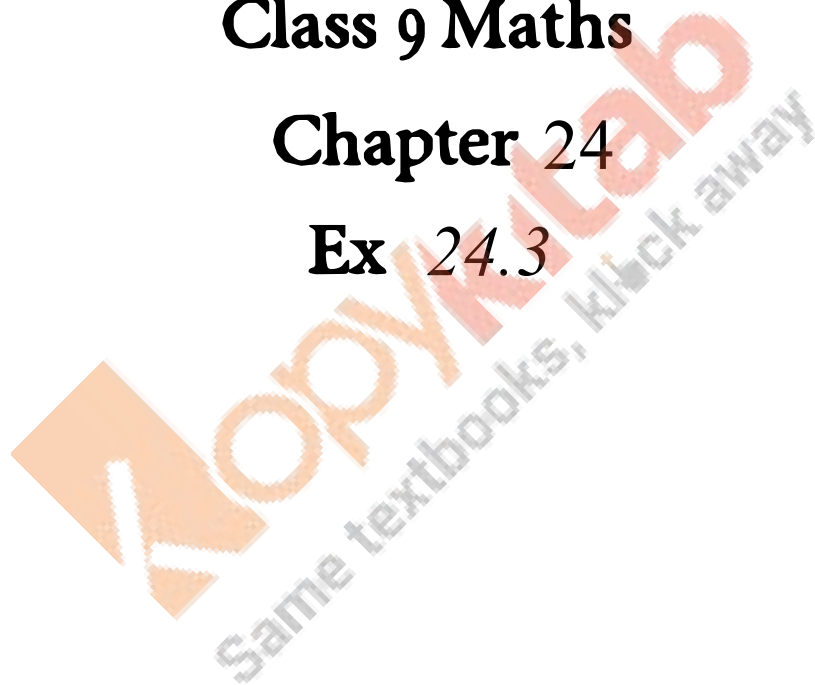
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Solutions

Class 9 Maths

Chapter 24

Ex 24.3



Find the median of the following data :

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 10$ (even)

$$\therefore \text{median} = \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2}$$

$$= \frac{\frac{10}{2}\text{th value} + (\frac{10}{2} + 1)\text{th value}}{2}$$

$$= \frac{5\text{th value} + 6\text{th value}}{2}$$

$$= \frac{45 + 54}{2}$$

$$= \frac{99}{2} = 49.5$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 10$ (even)

$$\therefore \text{median} = \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2}$$

$$= \frac{\frac{10}{2}\text{th value} + (\frac{10}{2} + 1)\text{th value}}{2}$$

$$= \frac{5\text{th value} + 6\text{th value}}{2}$$

$$= \frac{94 + 100}{2}$$

$$= \frac{194}{2} = 97$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 8$ (even)

$$\therefore \text{median} = \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2}$$

$$= \frac{\frac{8}{2}\text{th value} + (\frac{8}{2} + 1)\text{th value}}{2}$$

$$= \frac{4\text{th value} + 5\text{th value}}{2}$$

$$= \frac{31 + 35}{2}$$

$$= \frac{66}{2} = 33$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 9$ (odd)

$$\therefore \text{Median} = (\frac{n+1}{2})\text{th value}$$

$$= (\frac{9+1}{2})\text{th value}$$

$$= 5\text{th value} = 16$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 9$ (odd)

$$\therefore \text{Median} = (\frac{n+1}{2})\text{th value}$$

$$= (\frac{9+1}{2})\text{th value}$$

$$= 5\text{th value} = 71$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 10$ (even)

$$\begin{aligned}\therefore \text{median} &= \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2} \\ &= \frac{\frac{10}{2}\text{th value} + (\frac{10}{2} + 1)\text{th value}}{2} \\ &= \frac{5\text{th value} + 6\text{th value}}{2} \\ &= \frac{26 + 29}{2} \\ &= \frac{55}{2} = 27.5\end{aligned}$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 8$ (even)

$$\begin{aligned}\therefore \text{median} &= \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2} \\ &= \frac{\frac{8}{2}\text{th value} + (\frac{8}{2} + 1)\text{th value}}{2} \\ &= \frac{4\text{th value} + 5\text{th value}}{2} \\ &= \frac{8 + 12}{2} \\ &= \frac{20}{2} = 10\end{aligned}$$

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

SOLUTION :

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

Arranging the numbers in ascending order

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

$n = 10$ (even)

$$\begin{aligned}\therefore \text{median} &= \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2} \\ &= \frac{\frac{10}{2}\text{th value} + (\frac{10}{2} + 1)\text{th value}}{2}\end{aligned}$$

$$= \frac{5\text{th value} + 6\text{th value}}{2}$$

$$= \frac{67 + 69}{2}$$

$$= \frac{136}{2} = 68$$

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

SOLUTION :

Given the number of observation , $n = 8$

$$\therefore \text{median} = \frac{\frac{n}{2}\text{th value} + (\frac{n}{2} + 1)\text{th value}}{2}$$

$$= \frac{\frac{8}{2}\text{th value} + (\frac{8}{2} + 1)\text{th value}}{2}$$

$$= \frac{4\text{th value} + 5\text{th value}}{2}$$

$$= \frac{2x + 10 + 2x - 8}{2}$$

$$= 2x + 1$$

Given median = 25

$$\therefore 2x + 1 = 25$$

$$\Rightarrow 2x = 24$$

$$\Rightarrow x = 12$$

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 :

Given the numbers are 46 , 64 , 87 , 41 , 58 , 77 , 35 , 90 , 55 , 92 , 33

Arranging the numbers in ascending order

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

$n = 11$ (odd)

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

$$= \left(\frac{11+1}{2}\right)\text{th value}$$

$$= 6\text{th value} = 58$$

If 92 is replaced by 99 and 41 by 43

Then the new values are : 33 , 35 , 43 , 46 , 55 , 58 , 64 , 77 , 87 , 90 , 99

$n = 11$ (odd)

$$\therefore \text{NewMedian} = \left(\frac{n+1}{2}\right) \text{th value}$$

$$= \left(\frac{11+1}{2}\right) \text{th value}$$

$$= 6\text{th value} = 58$$

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 :

Given the numbers are 41 , 43 , 127 , 99 , 61 , 92 , 71 , 58 , 57

Arranging the numbers in ascending order

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

$$n = 9 \text{ (odd)}$$

$$\therefore \text{NewMedian} = \left(\frac{n+1}{2}\right) \text{th value}$$

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

$$= 5\text{th value} = 61$$

If 58 is replaced by 85

Then the new values be in order are : 41 , 43 , 57 , 61 , 71 , 85 , 92 , 99 , 127

$$\therefore \text{NewMedian} = \left(\frac{n+1}{2}\right) \text{th value}$$

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

$$= 5\text{th value} = 71$$

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 :

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

Arranging the numbers in ascending order

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

$$n = 15 \text{ (odd)}$$

$$\therefore \text{NewMedian} = \left(\frac{n+1}{2}\right) \text{th value}$$

$$= \left(\frac{15+1}{2}\right) \text{th value}$$

$$= 8\text{th value} = 35 \text{ kg}$$

If the weight 44 kg is replaced by 46 kg and 27 kg is replaced by 25 kg

Then the new values be in order are : 25 , 28 , 29 , 30 , 31 , 32 , 34 , 35 , 36 , 37 , 41 , 42 , 43 , 45 , 46

$$\therefore \text{NewMedian} = \left(\frac{n+1}{2}\right) \text{th value}$$

$$= \left(\frac{15+1}{2}\right) \text{th value}$$

$$= 8\text{th value} = 35 \text{ kg}$$

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 :

Total number of observations in the given data is 10 (even number) . So median of this data will be mean of $\frac{10}{2}$ i . e , 5th observation and $\frac{10}{2} + 1$ i . e , 6th observation.

$$\text{So , median of data} = \frac{5\text{th observation} + 6\text{th observation}}{2}$$

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

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

$$\Rightarrow 63 = x + 1$$

$$\Rightarrow x = 62$$

