RD Sharma Solutions

Class 7

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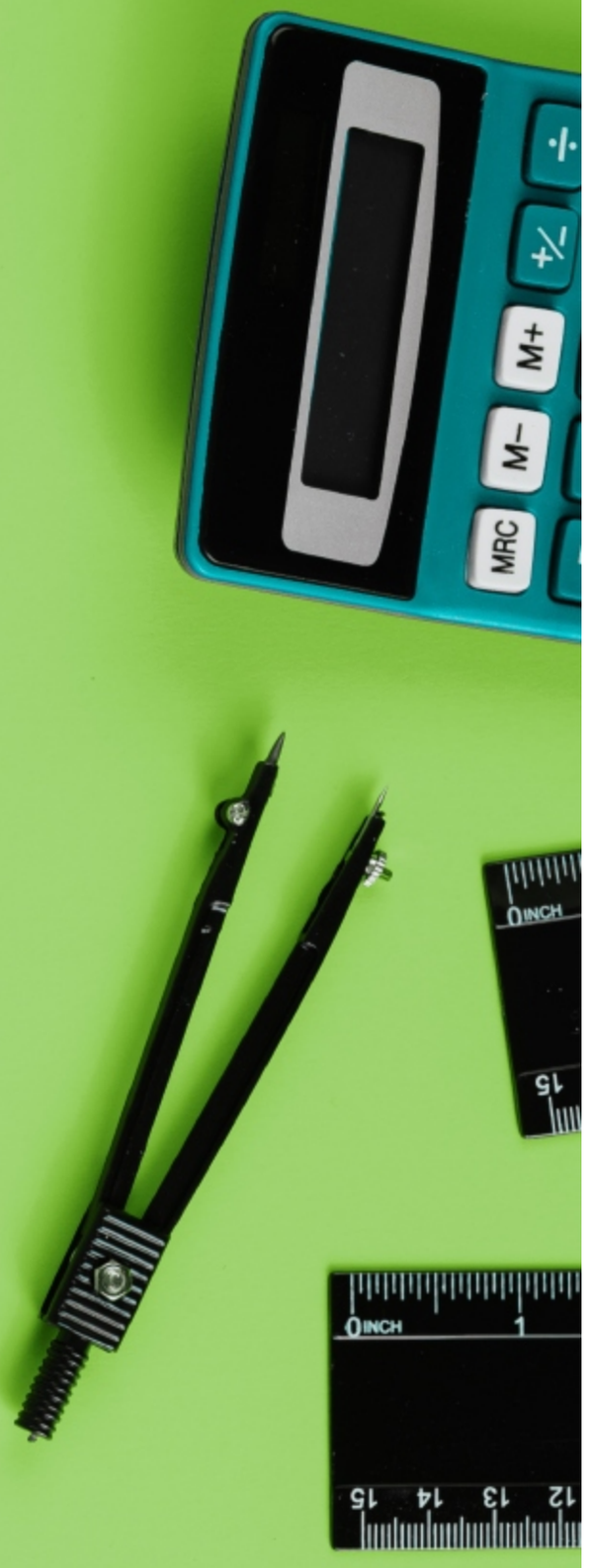

Exercise 23.3

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

(1) 83, 37, 70, 29, 45, 63, 41, 70, 34, 54

Solution: Arranging in ascending order, we get

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

here, no. of observations $(n) = 10$ (even)

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

$$= \frac{\left(\frac{10}{2}\right)^{th} + \left(\frac{10}{2}+1\right)^{th}}{2} = \frac{5^{th}\text{term} + 6^{th}\text{term}}{2}$$

$$= \frac{45+54}{2} = \frac{99}{2} = 49.5$$

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(2) 133, 73, 89, 108, 94, 104, 94, 85, 100, 120

Ascending order

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

here $n = 10$,

$$\text{Median} = \frac{5^{th}\text{ term} + 6^{th}\text{ term}}{2} = \frac{94+100}{2}$$

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

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

Solution: Ascending order

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

here $n = 8$

$$\text{Median} = \frac{\left(\frac{8}{2}\right)^{th} + \left(\frac{8}{2}+1\right)^{th}}{2}$$

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

$$= \frac{31+35}{2} = \frac{66}{2} = 33$$

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

Solution: Ascending order:

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

here $n = 9$ (odd)

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

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

$$= 16.$$

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Q.5 41, 43, 127, 99, 71, 92, 71, 58, 57

Ascending order:

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

here $n = 9$.

$$\text{Median} = \left(\frac{9+1}{2}\right)^{th} = \frac{10}{2}^{th} = 5^{th} \text{ observation}$$

$$= 71$$

Q.6 25, 34, 31, 23, 22, 26, 35, 29, 20, 32

Ascending order: 20, 22, 23, 25, 26, 29, 31, 32, 34, 35

here $n = 10$

$$\therefore \text{Median} = \frac{\left(\frac{10}{2}\right)^{th} + \left(\frac{10}{2}+1\right)^{th}}{2}$$

$$= \frac{5^{th} \text{ term} + 6^{th} \text{ term}}{2} = \frac{26+29}{2}$$

$$= \frac{55}{2} = 27.5$$

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

Ascending order: 3, 5, 7, 8, 12, 14, 15, 17

here $n = 8$

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$$\text{Median} = \frac{\left(\frac{8}{2}\right)^{th}\text{term} + \left(\frac{8}{2}+1\right)^{th}\text{term}}{2}$$

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

$$= \frac{8+12}{2} = \frac{20}{2} = 10$$

Q.8 92, 35, 67, 85, 72, 81, 56, 51, 42, 69

Sol: Ascending order

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

here $n = 10$

$$\text{Median} = \frac{\left(\frac{10}{2}\right)^{th} + \left(\frac{10}{2}+1\right)^{th}}{2} = \frac{5^{th} + 6^{th}}{2}$$

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

Q.9 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 $n = 9$

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

$\Rightarrow$ $25 = 5^{th}$ observation

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$\Rightarrow \quad 25 = 2x - 8$

$\Rightarrow \quad 25 + 8 = 2x \Rightarrow 2x = 33$

$\Rightarrow x = \frac{33}{2} = 16.5$

Q.10 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: Ascending order

33, 35, 41, 46, 55, 58, 64, 77, 87, 90, 42

here $n = 11$

$\therefore$ Median $= \left(\frac{11+1}{2}\right)^{th}$ term

$\Rightarrow$ Median $= 6^{th}$ term

$= 58$

here, Median $= 58$

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

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

New median $= 6^{th}$ term $= 58$

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Q.11 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: Ascending order

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

here $n = 9$

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

$$= 61$$

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

41, 43, 57, 61, 71, 85, 92, 99, 12

New median $= 5^{th}$ term $= 71$

Q.12 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 of 44 kg is replaced by 46 kg and 27 kg by 25 kg, find the new median.

Solution: here, ascending order is

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

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here $n = 15$ (odd)

$\therefore$ Median $= \left(\frac{15+1}{2}\right)^{th}$ term $= 8^{th}$ term

$= 35$ kg.

If two weights of 44 kg and 27 kg replaced by 46 kg and 25 kg, then ascending order is as follows:

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

Here Median $= 8^{th}$ term

$= 35$ kg

Q.13 The following observations are 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 $n = 10$

$$\text{Median} = \frac{\left(\frac{10}{2}\right)^{th} + \left(\frac{10}{2}+1\right)^{th}}{2} = \frac{5^{th} + 6^{th}}{2}$$

$$\Rightarrow 63 = \frac{x + x + 2}{2} \Rightarrow 126 = 2x + 2$$

$$\Rightarrow 2x = 126 - 2 = 124$$

$$\Rightarrow x = \frac{124}{2} = 62$$

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