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1. For the following 11 salaries, calculate the IQR and determine if any salaries are outliers. The salaries are in dollars.

\$33,000; \$64,500; \$28,000; \$54,000; \$72,000; \$68,500; \$69,000; \$42,000; \$54,000; \$120,000; \$40,500

Answer:

$$\text{IQR} = Q3 - Q1 = 68,500 - 40,500 = 28,000$$

smaller than $Q1 - 1.5 \times \text{IQR}$

larger than $Q3 + 1.5 \times \text{IQR}$ $Q3 + 1.5 \times \text{IQR}$ is an outlier.

- $40,500 - 1.5 \times 28,000 = 40,500 - 42,000 = -1,500$
- $68,500 + 1.5 \times 28,000 = 68,500 + 42,000 = 110,500$

\$120,000 is an outlier.

Final Answer:

IQR: \$28,000

Outliers: \$120,000

2. The following data show the number of months patients typically wait on a transplant list before getting surgery. The data are ordered from smallest to largest. Calculate the mean, median and mode.

Answer:

MEAN:

Number of data points: **39**

$$3+4+5+7(4)+8(2)+9(2)+10(5)+11+12(2)+13+14(2)+15(2)+17(2)+18+19(3)+21(2)+22(2)+23+24(4) = 544.$$

$$m = \frac{544}{39} = 13.95$$

MEDIAN:

Formula for the location: $\frac{n+1}{2}$

$$\frac{39 + 1}{2} = 20$$

The median is the 20th value, therefore the 20th value in the dataset is **13**.

MODE:

The mode of the given set of numbers is **10**, which appears 5 times.

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3. In a sample of 60 households, one house is worth \$2,500,000. Half of the rest are worth \$280,000, and all the others are worth \$315,000. Which is the better measure of the "center": the mean or the median?

Answer:

1 house worth: \$2,500,000

29 houses worth: \$280,000 each

30 houses worth: \$315,000 each

$1 \times 2,500,000 = 2,500,000$

$29 \times 280,000 = 8,120,000$

$30 \times 315,000 = 9,450,000$

Total value of all houses:

Total Value = $2,500,000 + 8,120,000 + 9,450,000 = 20,070,000$

$$\textbf{Mean} = \frac{\text{Total Value}}{\text{Number of Houses}} = \frac{20,070,000}{60} \approx \textbf{334,500}$$

Since there are 60 houses, the median will be the average of the 30th and 31st values in the ordered list:

30th value: \$315,000

31st value: \$315,000

$$\textbf{Median} = \frac{315,000 + 315,000}{2} = \textbf{315,000}$$

In this case, the median is a better measure of the "center" since it is less affected by extreme values

4. Maris conducted a study on the effect that playing video games has on memory recall. As part of her study, she compiled the following data. What is the best estimate for the mean number of hours spent playing video games?

Hours Teenagers Spend on Video Games	Number of Teenagers
0–3.5	3
3.5–7.5	7
7.5–11.5	12
11.5–15.5	7
15.5–19.5	9

Table 2.27

$$\text{Midpoint } \frac{0 + 3.5}{2} = 1.75$$

$$\text{Midpoint } \frac{3.5 + 7.5}{2} = 5.5$$

$$\text{Midpoint } \frac{7.5 + 11.5}{2} = 9.5$$

$$\text{Midpoint } \frac{11.5 + 15.5}{2} = 13.5$$

$$\text{Midpoint } \frac{15.5 + 19.5}{2} = 17.5$$

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House Teenagers Spend on Video Games	Midpoint
0-3.5	1.75
3.5-7.5	5.5
7.5-11.5	9.5
11.5-15.5	13.5
15.5-19.5	17.5

$$1.75(3) + 5.5(7) + 9.5(12) + 13.5(7) + 17.5(9) = \mathbf{409.75}$$

$$\mu \frac{\sum fm}{\sum} = \frac{409.75}{38} = \mathbf{10.78}$$