

Boxplot Detectives

Find and compare the five key values.

GRADE 8 • 8.PS.2

8.PS.2 "The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on boxplots..."

NAME _____

DATE _____

BUILD THE SUMMARY

Put the data in order. The minimum, Q1, median, Q3, and maximum make a five-number summary for a boxplot. The range is maximum minus minimum, and the IQR is Q3 minus Q1.

WORKED EXAMPLE

Find the five-number summary for
2, 5, 8, 10, 13, 16, 20, 24.

1. The data are already in order.
2. Median = $(10 + 13) / 2 = 11.5$.
3. Q1 = $(5 + 8) / 2 = 6.5$; Q3 = $(16 + 20) / 2 = 18$.
4. Minimum = 2; maximum = 24.

Answer: 2, 6.5, 11.5, 18, 24

PRACTICE 5 problems

- 1** Find the five-number summary: 1, 4, 7, 9, 12, 15, 19, 23.

ANSWER _____

- 2** A boxplot has minimum 6, Q1 11, median 14, Q3 17, and maximum 29. Find the range and IQR.

ANSWER _____

- 3** A boxplot has Q1 = 21 and Q3 = 27. Between which values are the middle half of the data?

ANSWER _____

- 4** The data are 28, 30, 32, 34, 36, 38, 40, 70. Which value is far from the rest, and how does it affect the boxplot?

ANSWER _____

- 5** You want to show the median, quartiles, spread, and possible outliers in classmates' numbers of songs listened to yesterday. Which graph is best?

ANSWER _____

APPLY IT Show your work

- 1** A gaming club records the number of minutes eight members spend practicing on Saturday: 41, 43, 46, 48, 49, 52, 54, 57. Find the five-number summary for a boxplot.

WORK SPACE

ANSWER _____

- 2** Two groups track their daily screen-free minutes. Group A has $Q1 = 37$, median = 42, and $Q3 = 46$. Group B has $Q1 = 39$, median = 45, and $Q3 = 48$. Which group has the higher typical result? Which group is more consistent based on IQR?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

These sorted values are 60, 62, 64, 66, 68, 69, 71, 98. Use the 1.5 IQR rule. Is 98 an outlier? Explain how it changes the boxplot.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the five-number summary: 1, 4, 7, 9, 12, 15, 19, 23.	1, 5.5, 10.5, 17, 23
2	A boxplot has minimum 6, Q1 11, median 14, Q3 17, and maximum 29. Find the range and IQR.	Range = 23; IQR = 6
3	A boxplot has Q1 = 21 and Q3 = 27. Between which values are the middle half of the data?	21 to 27
4	The data are 28, 30, 32, 34, 36, 38, 40, 70. Which value is far from the rest, and how does it affect the boxplot?	70; it makes the right side stretch farther and increases the range.
5	You want to show the median, quartiles, spread, and possible outliers in classmates' numbers of songs listened to yesterday. Which graph is best?	A boxplot

PART 2 • APPLY IT

- 41, 44.5, 48.5, 53, 57** Order the values, then find the medians of the full set and each half. The minimum and maximum are the endpoints.
- Group B has the higher typical result. Both groups are equally consistent because each IQR is 9.** Compare medians for a typical result. Calculate each IQR by subtracting Q1 from Q3.

CHALLENGE

Yes. Q1 = 63, Q3 = 70, and IQR = 7. The upper fence is 80.5, so 98 is an outlier. Plot it separately above the upper whisker; it makes the full data range 38 and the distribution look right-skewed.

Accept five-number summaries written with labels or in order. For the challenge, accept equivalent reasoning that 98 is above the upper fence and is plotted separately from the whisker.