LESSON MAKER PRO

# Boxplot Detectives

*Use five-number summaries to notice patterns in data.*

**GRADE 8 · 8.PS.2.g**

**8.PS.2.g** "Analyze data represented in a boxplot by making observations and drawing conclusions."

NAME _____ DATE _____

## READ THE SPREAD

A boxplot shows the minimum, first quartile (Q1), median, third quartile (Q3), and maximum. Find the interquartile range, or IQR, by subtracting Q1 from Q3. The box contains the middle 50% of the data, while the range goes from the minimum to the maximum.

## WORKED EXAMPLE

A boxplot has minimum 3, Q1 7, median 11, Q3 16, and maximum 22. Find the IQR and the range.

1. Subtract Q1 from Q3: 16 - 7 = 9.
2. Subtract the minimum from the maximum: 22 - 3 = 19.
3. The IQR measures the spread of the middle half of the data.
4. The range measures the total spread of the data.

**Answer: IQR = 9; range = 19**

## PRACTICE 6 problems

**1** A boxplot has minimum 2, Q1 6, median 10, Q3 15, and maximum 21. What is the IQR?

**ANSWER** _____

**2** A boxplot has minimum 1, Q1 5, median 8, Q3 14, and maximum 20. What is the range?

**ANSWER** _____

**3** A boxplot has minimum 0, Q1 12, median 17, Q3 23, and maximum 30. What interval contains the middle 50% of the data?

**ANSWER** _____

**4** A boxplot has minimum 4, Q1 9, median 13, Q3 18, and maximum 25. What value splits the data into a lower half and an upper half?

**ANSWER** _____

**5** A boxplot has minimum 4, Q1 9, median 14, Q3 20, and maximum 28. Is the lower quarter or the upper quarter more spread out? Show both lengths.

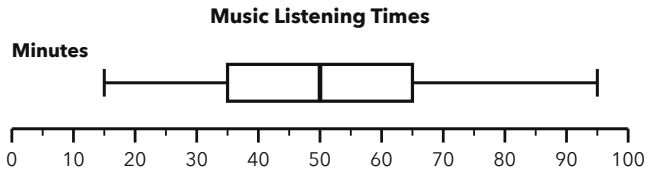
**ANSWER** _____

**6** Team A has minimum 2, Q1 8, median 12, Q3 17, and maximum 29. Team B has minimum 1, Q1 10, median 15, Q3 21, and maximum 31. Which team has a less spread-out middle 50%?

**ANSWER** _____

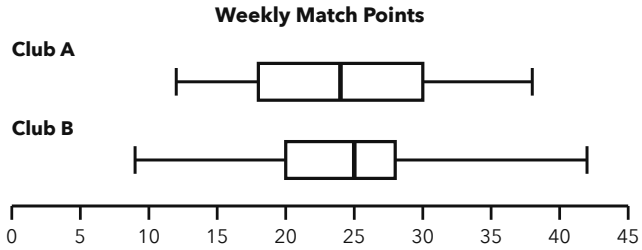
## APPLY IT Show your work

**1** The boxplot shows the number of minutes students in a music club listened to music on one day. Find the IQR. Then state what the box tells you about the middle 50% of listening times.




**ANSWER** _____

**2** The boxplots show points earned by two gaming clubs in several weekly matches. Which club had more consistent scores in the middle 50%? Explain using the IQRs.




**ANSWER** _____

## CHALLENGE One step up

Boxplot A has minimum 2, Q1 9, median 14, Q3 21, and maximum 32. Boxplot B has minimum 5, Q1 12, median 14, Q3 17, and maximum 35. Maya says, "Boxplot B has less overall variability because its IQR is smaller." Is Maya correct? Explain your reasoning.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Boxplot Detectives

**GRADE 8 · 8.PS.2.g**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | A boxplot has minimum 2, Q1 6, median 10, Q3 15, and maximum 21. What is the IQR? | **9** |
| 2 | A boxplot has minimum 1, Q1 5, median 8, Q3 14, and maximum 20. What is the range? | **19** |
| 3 | A boxplot has minimum 0, Q1 12, median 17, Q3 23, and maximum 30. What interval contains the middle 50% of the data? | **12 to 23** |
| 4 | A boxplot has minimum 4, Q1 9, median 13, Q3 18, and maximum 25. What value splits the data into a lower half and an upper half? | **13** |
| 5 | A boxplot has minimum 4, Q1 9, median 14, Q3 20, and maximum 28. Is the lower quarter or the upper quarter more spread out? Show both lengths. | **The upper quarter is more spread out. Lower quarter: 9 - 4 = 5; upper quarter: 28 - 20 = 8.** |
| 6 | Team A has minimum 2, Q1 8, median 12, Q3 17, and maximum 29. Team B has minimum 1, Q1 10, median 15, Q3 21, and maximum 31. Which team has a less spread-out middle 50%? | **Team A. Its IQR is 17 - 8 = 9, and Team B's IQR is 21 - 10 = 11.** |

## PART 2 · APPLY IT

1. **The IQR is 30 minutes. The middle 50% listened from 35 to 65 minutes.** Subtract 35 from 65 to find the IQR. The box extends from Q1, 35 minutes, to Q3, 65 minutes.
2. **Club B had more consistent middle scores. Club A's IQR is 12 points, and Club B's IQR is 8 points.** Find each IQR: 30 - 18 = 12 and 28 - 20 = 8. A smaller IQR means the middle half of the scores is less spread out.

## CHALLENGE

**Maya is not correct about overall variability. Boxplot B has a smaller IQR, 5 compared with 12, so its middle 50% is less spread out. However, both boxplots have a range of 30, so their overall spread is the same.**

Accept equivalent subtraction statements and conclusions that correctly compare the middle 50% using IQR. For the challenge, students must distinguish IQR, which describes the middle half, from range, which describes total spread.