

Box Plot Detectives

Find spread, read data, spot outliers.

GRADE 7 • NY-7.SP.1

NY-7.SP.1 "Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier."

NAME _____

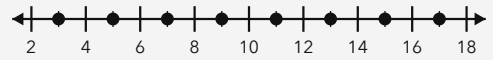
DATE _____

BOX PLOT RULES

Order the data, then find the minimum, Q1, median, Q3, and maximum to make a box plot. $IQR = Q3 - Q1$. A value below $Q1 - 1.5(IQR)$ or above $Q3 + 1.5(IQR)$ is an outlier.

WORKED EXAMPLE

The dots show 8 data values. Find the IQR and decide whether any value is an outlier.



1. $Q1 = (5 + 7) / 2 = 6$; $Q3 = (13 + 15) / 2 = 14$.

2. $IQR = 14 - 6 = 8$.

3. Fences: $6 - 1.5(8) = -6$ and $14 + 1.5(8) = 26$.

4. All dots are between -6 and 26.

Answer: IQR = 8; there are no outliers.

PRACTICE 4 problems

- 1** Use the data to find the five-number summary. Then draw a box plot: 31, 33, 35, 37, 39, 41, 43, 45.

ANSWER _____

- 2** Find the IQR: 51, 54, 56, 59, 61, 64, 66, 69.

ANSWER _____

- 3** Is 98 an outlier? Use 72, 74, 75, 76, 78, 79, 80, 98.

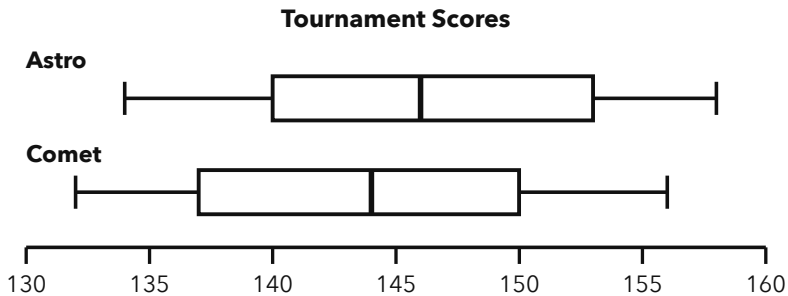
ANSWER _____

- 4** A data set has $Q1 = 90$ and $Q3 = 102$. Is 121 an outlier?

ANSWER _____

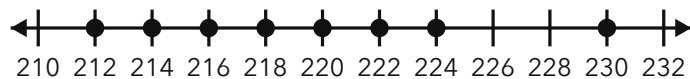
APPLY IT Show your work

- 1** Two esports clubs recorded each player's score in one tournament round. Which club has the larger IQR? What does this say about the middle half of the scores?



ANSWER _____

- 2** A student logged minutes practicing a new song on 8 days. Use the dots to find the five-number summary and decide whether there is an outlier.



ANSWER _____

CHALLENGE One step up

A student says that 340 is an outlier because it is much larger than the next value. Is the student correct? Use the 1.5(IQR) rule to explain: 310, 312, 313, 315, 317, 319, 320, 340.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Use the data to find the five-number summary. Then draw a box plot: 31, 33, 35, 37, 39, 41, 43, 45.	31, 34, 38, 42, 45
2	Find the IQR: 51, 54, 56, 59, 61, 64, 66, 69.	10
3	Is 98 an outlier? Use 72, 74, 75, 76, 78, 79, 80, 98.	Yes. 98 is an outlier.
4	A data set has $Q1 = 90$ and $Q3 = 102$. Is 121 an outlier?	Yes. 121 is an outlier.

PART 2 • APPLY IT

- Neither club. Both IQRs are 13, so the middle half of each club's scores has the same spread.**
Astro: $153 - 140 = 13$. Comet: $150 - 137 = 13$.
- Five-number summary: 212, 215, 219, 223, 230. There are no outliers.** The IQR is $223 - 215 = 8$.
The fences are 203 and 235, so every value is inside the fences.

CHALLENGE

Yes. $Q1 = 312.5$ and $Q3 = 319.5$, so the IQR is 7. The upper fence is 330, and 340 is above it, so 340 is an outlier.

Accept correctly drawn box plots that use the stated five-number summary. For outliers, accept equivalent fence calculations and conclusions using the $1.5(IQR)$ rule.