

Quartiles & Box-and-Whisker Plots

Statistics Worksheet · Grade 6–9

Name: _____

Date: _____

Learning Objectives

- Arrange a data set in order from least to greatest and identify the median (Q2)
- Calculate the first quartile (Q1) and third quartile (Q3) from a data set
- Construct and interpret a box-and-whisker plot using the five-number summary

Problems

1. Arrange the following data set in order from least to greatest: 14, 7, 22, 3, 18, 11, 9
 14, 7, 22, 3, 18, 11, 9

2. Find the median of the following ordered data set: 5, 8, 12, 15, 20, 24, 31
 5, 8, 12, 15, 20, 24, 31

3. Find the median of the following data set: 10, 22, 34, 46, 58, 70
 10, 22, 34, 46, 58, 70

4. For the ordered data set below, find Q1, the median, and Q3. The data set is: 3, 7, 9, 11, 14, 18, 22
 3, 7, 9, 11, 14, 18, 22

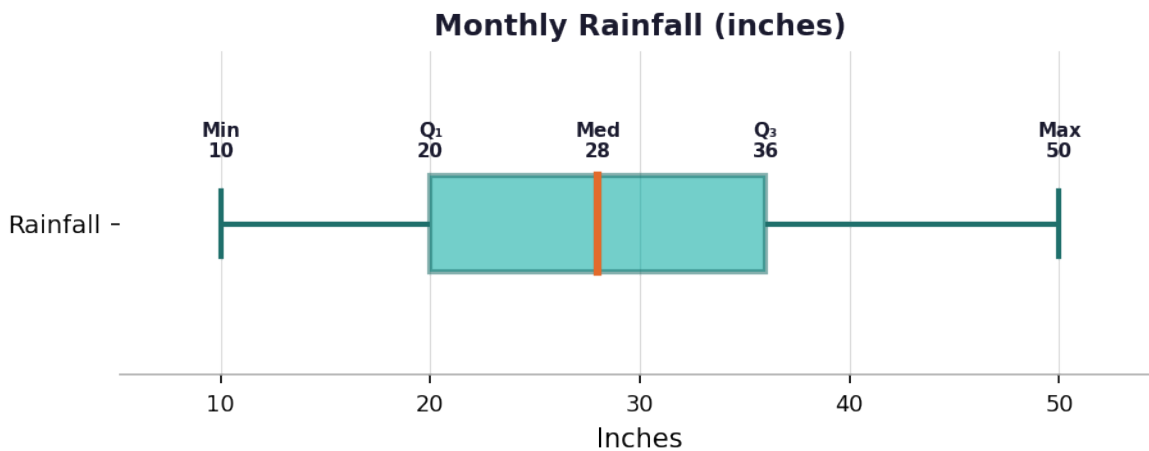
5. The table below shows a data set. Fill in the missing values for the five-number summary.

Statistic	Value
Data Set (ordered)	4, 8, 13, 17, 21, 26, 30, 35
Minimum	4
Q1 (First Quartile)	
Median (Q2)	



Statistic	Value
Q3 (Third Quartile)	
Maximum	35

6. Use the box-and-whisker plot below to answer: What are the minimum, Q1, median, Q3, and maximum values? Then find the Interquartile Range (IQR) and the range.



7. The following data shows the number of books read by students in a month: 2, 5, 7, 8, 10, 12, 14, 17, 19, 21. Find the five-number summary and construct a box-and-whisker plot on the number line provided.

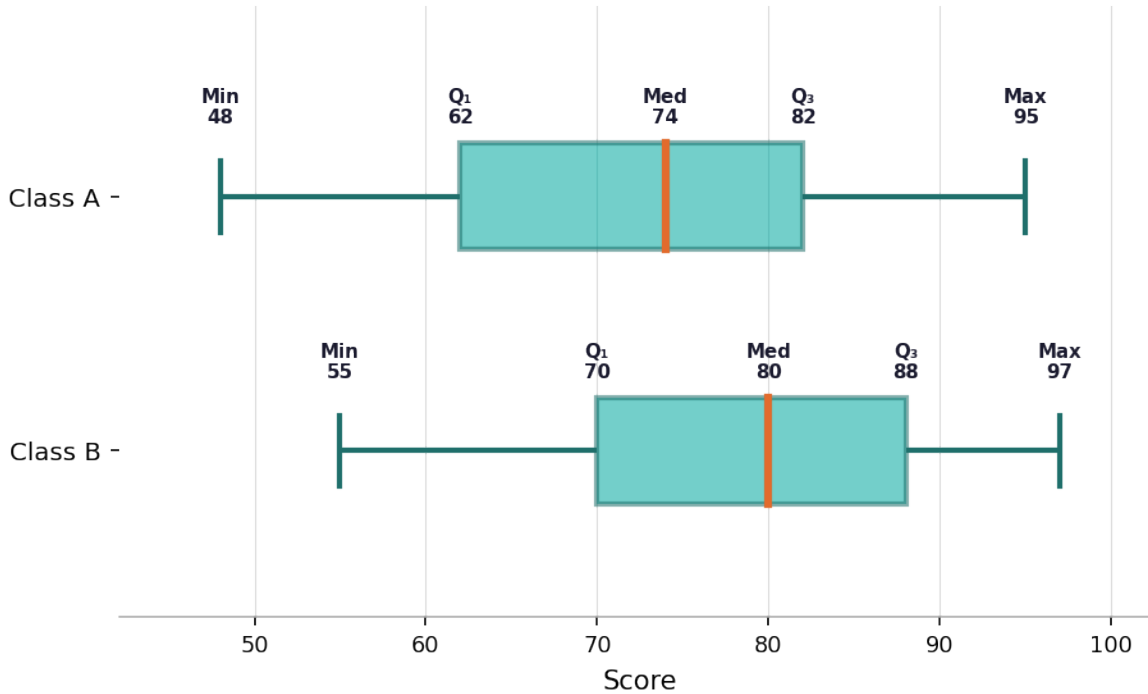


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8. Compare the two box-and-whisker plots showing test scores for Class A and Class B. Which class has a higher median? Which class has a greater spread (IQR)? Which class performed more consistently?

Test Score Comparison: Class A vs Class B



9. A data set has the following values: 12, 15, 18, 20, 22, 24, 27, 60. Calculate Q₁, Q₃, and the IQR. Then determine whether 60 is an outlier using the rule: a value is an outlier if it is greater than $Q_3 + 1.5 \times \text{IQR}$.

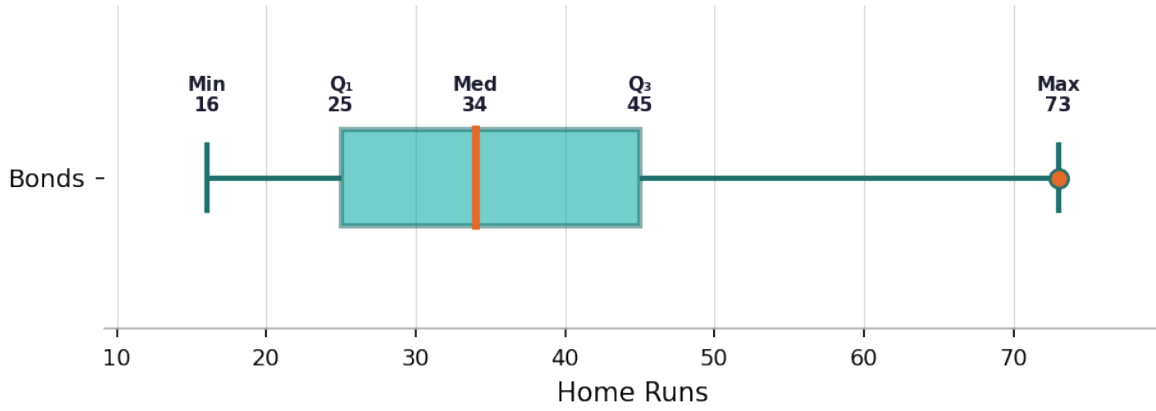
12, 15, 18, 20, 22, 24, 27, 60

10. Barry Bonds had the following home run totals over his career seasons: 16, 25, 24, 19, 33, 25, 34, 46, 37, 33, 42, 40, 49, 73, 45, 45, 26, 28, 34, 45. Find the complete five-number summary (minimum, Q₁, median, Q₃, maximum) and identify the IQR. Then describe whether the distribution appears to be skewed, and explain your reasoning.

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Barry Bonds Career Home Runs



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Quartiles & Box-and-Whisker Plots — Answer Key

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Answer Key

1. Answer: 3, 7, 9, 11, 14, 18, 22

- Identify the smallest value: 3
- Continue ordering: 3, 7, 9, 11, 14, 18, 22

2. Answer: Median = 15

- Count the values: there are 7 values (odd count)
- The middle position is position 4
- The 4th value is 15, so the median = 15

3. Answer: Median = 40

- There are 6 values (even count), so the median is the average of the 3rd and 4th values
- 3rd value = 34, 4th value = 46
- Median = $(34 + 46) \div 2 = 80 \div 2 = 40$

4. Answer: Q1 = 7, Median = 11, Q3 = 18

- Median (Q2) is the 4th value: 11
- Lower half: 3, 7, 9 — middle value is 7, so Q1 = 7
- Upper half: 14, 18, 22 — middle value is 18, so Q3 = 18

5. Answer: Q1 = 10.5, Median = 19, Q3 = 28

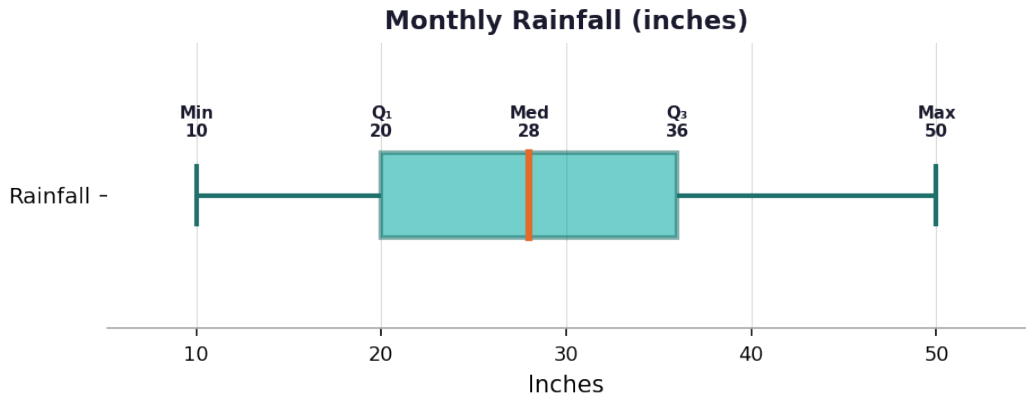
Statistic	Value
Data Set (ordered)	4, 8, 13, 17, 21, 26, 30, 35
Minimum	4
Q1 (First Quartile)	10.5
Median (Q2)	19
Q3 (Third Quartile)	28
Maximum	35

- 8 values total (even), so median = average of 4th and 5th values: $(17 + 21) \div 2 = 19$
- Lower half: 4, 8, 13, 17 → Q1 = $(8 + 13) \div 2 = 10.5$
- Upper half: 21, 26, 30, 35 → Q3 = $(26 + 30) \div 2 = 28$

6. Answer: Min=10, Q1=20, Median=28, Q3=36, Max=50; IQR=16, Range=40

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- Read values from the box plot: Min=10, Q₁=20, Median=28, Q₃=36, Max=50
- IQR = Q₃ – Q₁ = 36 – 20 = 16
- Range = Max – Min = 50 – 10 = 40

7. Answer: Min=2, Q₁=7, Median=11, Q₃=17, Max=21; IQR=10

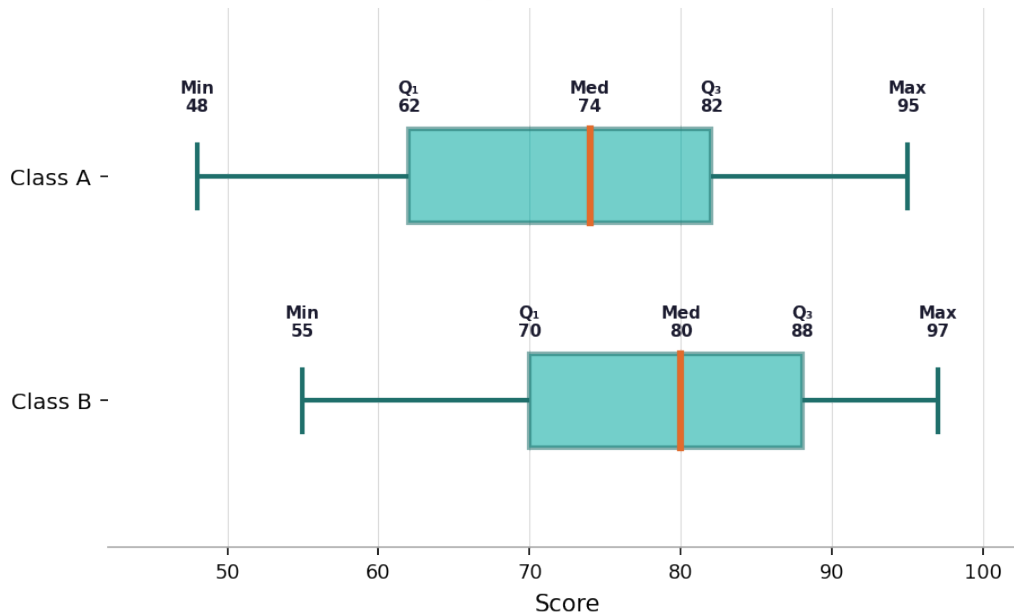


- 10 values (even), so median = average of 5th and 6th: $(10 + 12) \div 2 = 11$
- Lower half: 2, 5, 7, 8, 10 → Q₁ = 7 (middle value)
- Upper half: 12, 14, 17, 19, 21 → Q₃ = 17 (middle value)
- IQR = Q₃ – Q₁ = 17 – 7 = 10
- Plot: whisker from 2 to 7, box from 7 to 17 with line at 11, whisker from 17 to 21

8. Answer: Class B has a higher median (80 vs 74). Class A has a greater IQR (20 vs 18). Class B performed more consistently.



Test Score Comparison: Class A vs Class B



- Class A: Median = 74, IQR = 82 – 62 = 20
- Class B: Median = 80, IQR = 88 – 70 = 18
- Class B has a higher median, meaning overall higher scores
- Class A has a larger IQR, meaning more variability/spread in scores
- Class B's smaller IQR means scores were more clustered — performed more consistently

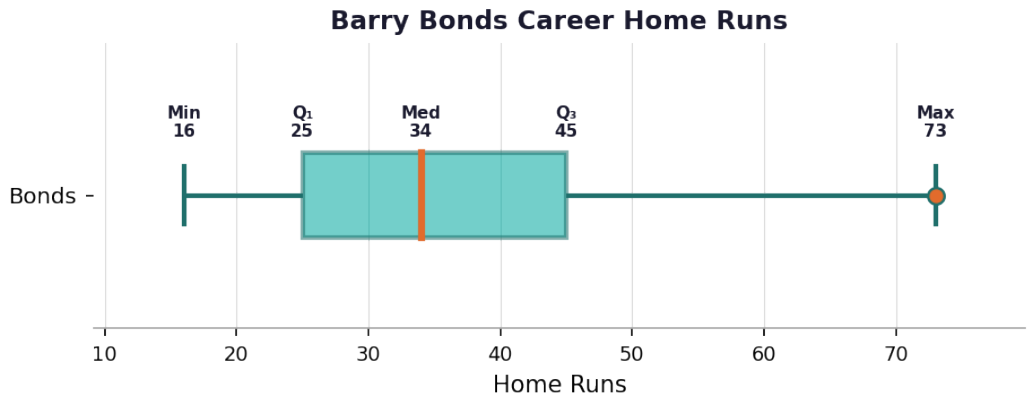
9. Answer: Q1=16.5, Q3=25.5, IQR=9; Upper fence=39; Yes, 60 is an outlier.

- 8 values; Median = $(20 + 22) \div 2 = 21$
- Lower half: 12, 15, 18, 20 → $Q_1 = (15 + 18) \div 2 = 16.5$
- Upper half: 22, 24, 27, 60 → $Q_3 = (24 + 27) \div 2 = 25.5$
- $IQR = 25.5 - 16.5 = 9$
- Upper fence = $Q_3 + 1.5 \times IQR = 25.5 + 13.5 = 39$
- Since $60 > 39$, the value 60 is an outlier

10. Answer: Min=16, Q1=25, Median=34, Q3=45, Max=73; IQR=20. The distribution is right-skewed because the upper whisker (73–45=28) is longer than the lower whisker (25–16=9), and 73 may be an outlier.

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- Arrange in order: 16, 19, 24, 25, 25, 26, 28, 33, 33, 34, 34, 37, 40, 42, 45, 45, 45, 46, 49, 73
- 20 values (even); Median = average of 10th and 11th values: $(34 + 34) \div 2 = 34$
- Lower half (first 10): 16, 19, 24, 25, 25, 26, 28, 33, 33, 34 → $Q_1 = (25 + 26) \div 2 = 25.5 \approx 25$
- Upper half (last 10): 34, 37, 40, 42, 45, 45, 45, 46, 49, 73 → $Q_3 = (45 + 45) \div 2 = 45$
- $IQR = Q_3 - Q_1 = 45 - 25 = 20$
- Upper fence = $45 + 1.5(20) = 75$; $73 < 75$ so technically not a formal outlier, but the long upper whisker suggests right skew
- The distribution is right-skewed: the long right tail (up to 73) pulls the data upward

