9.11 Quartiles and the Five-Number Summary

Chapter 9: Statistics and Data Analysis

Name: _____ Date: _____ Class/Period: _____

Problem 9.161 Order $1, 2, 3, 4, 5, 6, 7$, apply this book's quartile convention, and find the five-number summary.

Problem 9.162 Find the five-number summary of $2, 4, 6, 8, 10, 12, 14, 16$. Show the two middle values used for the median and for each quartile.

Problem 9.163 A data set has $Q_1 = 18$ and $Q_3 = 31$. Find the IQR and explain what part of the data it measures.

Problem 9.164 A data set has $Q_1 = 7$ and IQR 12. Find Q_3 and check the distance between the quartiles.

Problem 9.165 The five-number summary is $(4, 9, 12, 18, 30)$. Find the range and compare it with the IQR.

Problem 9.166 Explain why approximately 50 percent of the observations lie between Q_1 and Q_3, even if the numerical interval is narrow.

Problem 9.167 For quiz scores, $Q_3 = 85$. Write a kid-friendly interpretation using "about three quarters" and "about one quarter."

Problem 9.168 Can IQR exceed range? Use the positions of Q_1, Q_3, minimum, and maximum to justify your answer.

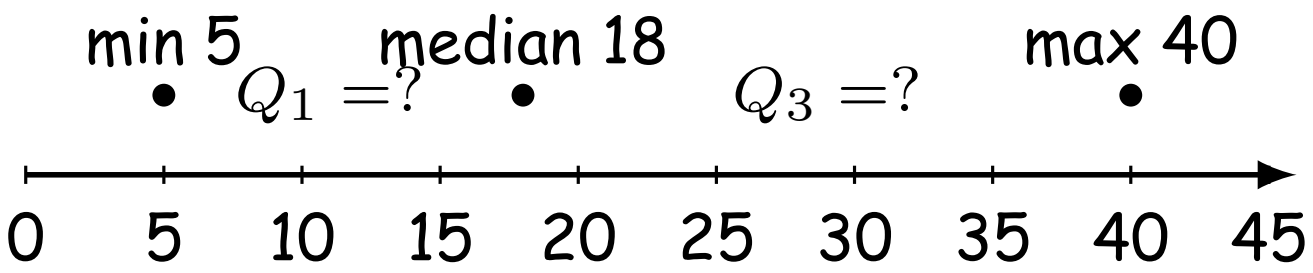
Problem 9.169 Create a data set with IQR 0. Explain what must happen in the middle half.

Problem 9.170 One extreme maximum increases by 100. Which parts of the five-number summary must change, and which may remain fixed?

Problem 9.171 Explain why two calculators can report slightly different quartiles for the same odd-sized data set.

Problem 9.172 Two data sets have equal ranges but different IQRs. Explain what this reveals about the concentration of their middle halves.

Problem 9.173 The minimum, median, and maximum are marked.



The IQR is 16. Give two possible pairs (Q_1, Q_3) that fit the scale and ordering. Explain why the answer is not unique.

Problem 9.174 Find the five-number summary, range, and IQR of $3, 5, 5, 8, 9, 10, 12, 14, 20$. Then sketch the five summary positions on a number line.

Problem 9.175 Create an 8-value data set with five-number summary $(1, 4, 7, 10, 15)$. Verify each summary value under the stated quartile convention.

Problem 9.176 Construct two 9-value data sets with the same five-number summary but different means. Explain what information the summary discards.