Statistics and Data Displays

Lesson 5 Quartiles and Interquartile Range

Standards 6.SP.A.3, 6.SP.B.5c

Learning target I can calculate quartiles and interquartile range.

Materials Grid paper, rulers, colored pencils, data tables.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about quartiles and interquartile range. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Sort the data. Find the median, then the median of each half for Q1 and Q3. For an odd count, exclude the overall median from both halves in this course. IQR = Q3 - Q1; range = maximum - minimum. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: Reading times in minutes are 8, 9, 9, 10, 11, 20. Find Q1, Q3, IQR, and range. Explain what IQR describes. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch sorting before finding medians, quartile conventions, counting every observation once, and mean versus variability.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learn and Discuss

Sort the data. Find the median, then the median of each half for Q1 and Q3. For an odd count, exclude the overall median from both halves in this course. IQR = Q3 - Q1; range = maximum - minimum.

Example 1 Reading times in minutes are 7, 8, 8, 9, 9, 10. Find Q1, Q3, IQR, and range.
Solution Q1 8, Q3 9; IQR 1 min; range 3 min. Lower half [7, 8, 8] has median 8; upper half [9, 9, 10] has median 9. Subtract Q1 from Q3.
Example 2 Reading times in minutes are 3, 4, 4, 5, 6, 15. Find Q1, Q3, IQR, and range. Explain what IQR describes.
Solution Q1 4, Q3 6; IQR 2 min; range 12 min; IQR is the span of the middle half. Lower half [3, 4, 4] has median 4; upper half [5, 6, 15] has median 6. Subtract Q1 from Q3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Quartiles and Interquartile Range

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 2, 3, 3, 4, 4, 5. Find Q1, Q3, IQR, and range.

2. Reading times in minutes are 6, 7, 7, 8, 8, 9. Find Q1, Q3, IQR, and range.

3. Reading times in minutes are 8, 9, 9, 10, 10, 11. Find Q1, Q3, IQR, and range.

4. Reading times in minutes are 3, 8, 8, 13, 13, 18. Find Q1, Q3, IQR, and range.

5. Reading times in minutes are 5, 8, 8, 11, 11, 14. Find Q1, Q3, IQR, and range.

6. Reading times in minutes are 5, 7, 7, 9, 9, 11. Find Q1, Q3, IQR, and range.

7. Reading times in minutes are 2, 3, 3, 4, 5, 14. Find Q1, Q3, IQR, and range. Explain what IQR describes.

8. Reading times in minutes are 5, 6, 6, 7, 8, 17. Find Q1, Q3, IQR, and range. Explain what IQR describes.

9. Reading times in minutes are 7, 8, 8, 9, 10, 19. Find Q1, Q3, IQR, and range. Explain what IQR describes.

10. Reading times in minutes are 8, 9, 9, 10, 11, 20. Find Q1, Q3, IQR, and range. Explain what IQR describes.

Quartiles and Interquartile Range

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1. Q1 3, Q3 4; IQR 1 min; range 3 min
Reasoning Lower half [2, 3, 3] has median 3; upper half [4, 4, 5] has median 4. Subtract Q1 from Q3.

2. Q1 7, Q3 8; IQR 1 min; range 3 min
Reasoning Lower half [6, 7, 7] has median 7; upper half [8, 8, 9] has median 8. Subtract Q1 from Q3.

3. Q1 9, Q3 10; IQR 1 min; range 3 min
Reasoning Lower half [8, 9, 9] has median 9; upper half [10, 10, 11] has median 10. Subtract Q1 from Q3.

4. Q1 8, Q3 13; IQR 5 min; range 15 min
Reasoning Lower half [3, 8, 8] has median 8; upper half [13, 13, 18] has median 13. Subtract Q1 from Q3.

5. Q1 8, Q3 11; IQR 3 min; range 9 min
Reasoning Lower half [5, 8, 8] has median 8; upper half [11, 11, 14] has median 11. Subtract Q1 from Q3.

6. Q1 7, Q3 9; IQR 2 min; range 6 min
Reasoning Lower half [5, 7, 7] has median 7; upper half [9, 9, 11] has median 9. Subtract Q1 from Q3.

7. Q1 3, Q3 5; IQR 2 min; range 12 min; IQR is the span of the middle half
Reasoning Lower half [2, 3, 3] has median 3; upper half [4, 5, 14] has median 5. Subtract Q1 from Q3.

8. Q1 6, Q3 8; IQR 2 min; range 12 min; IQR is the span of the middle half
Reasoning Lower half [5, 6, 6] has median 6; upper half [7, 8, 17] has median 8. Subtract Q1 from Q3.

9. Q1 8, Q3 10; IQR 2 min; range 12 min; IQR is the span of the middle half
Reasoning Lower half [7, 8, 8] has median 8; upper half [9, 10, 19] has median 10. Subtract Q1 from Q3.

10. Q1 9, Q3 11; IQR 2 min; range 12 min; IQR is the span of the middle half
Reasoning Lower half [8, 9, 9] has median 9; upper half [10, 11, 20] has median 11. Subtract Q1 from Q3.