Five-Number Summary and Interquartile Range Worksheet

1. Given the data set $\{2, 8, 10, 15, 21, 23, 28\}$, calculate:

   (a) The Five-Number Summary

   (b) The Interquartile Range (IQR)

2. Identify the outliers for the data set $\{4, 7, 9, 12, 15, 18, 25, 30, 50\}$ using the IQR method.

3. Construct a box plot for the data set $\{10, 12, 15, 18, 20, 22, 30, 35\}$. Label all components clearly.

4. Interpret the box plot you constructed in Question 3. Discuss:

   (a) The spread of the data

   (b) Potential skewness

   (c) Any outliers

5. A company analyzed salaries $\{30,000, 32,000, 35,000, 40,000, 42,000, 55,000, 70,000\}$:

   (a) Calculate the Five-Number Summary.

   (b) Determine if there are any outliers.

   (c) Construct a box plot to represent the data.

6. Real-world application: A researcher collected data on daily rainfall (in mm) for a week: $\{2.1, 2.5, 3.0, 3.8, 4.0, 4.5, 5.2\}$.

   (a) Calculate the Five-Number Summary.

   (b) Determine the IQR and any potential outliers.

   (c) Construct a box plot to visualize the rainfall data.

Solutions for Five-Number Summary and Interquartile Range Worksheet

1. **Solution for Question 1:**

   (a) Five-Number Summary: Minimum = 2, Q1 = 8, Median = 15, Q3 = 23, Maximum = 28.

   (b) IQR = Q3 - Q1 = 23 - 8 = 15.

2. **Solution for Question 2:** Outliers are determined by:

   (a) IQR = 18 - 7 = 11.

   (b) Lower Bound = Q1 - 1.5 $\cdot IQR = 7 - 16.5 = -9.5 (none below). Upper Bound = Q3 + 1.5 \cdot IQR = 18 + 16.5 = 34.5. Outlier : 50.$

3. **Solution for Question 3:** Box plot is constructed with:

   (a) Minimum = 10, Q1 = 15, Median = 20, Q3 = 30, Maximum = 35.

4. **Solution for Question 4:** Interpretation of the box plot:

   (a) Spread: The data spans from 10 to 35.

   (b) Skewness: Slightly skewed to the right.

   (c) Outliers: None identified.

5. **Solution for Question 5:** Salary analysis:

   (a) Five-Number Summary: Minimum = 30,000, Q1 = 32,000, Median = 40,000, Q3 = 55,000, Maximum = 70,000.

   (b) IQR = 55,000 - 32,000 = 23,000. Outliers: None.

6. **Solution for Question 6:** Rainfall analysis:

   (a) Five-Number Summary: Minimum = 2.1, Q1 = 2.5, Median = 3.8, Q3 = 4.5, Maximum = 5.2.

   (b) IQR = 4.5 - 2.5 = 2.0. Outliers: None.