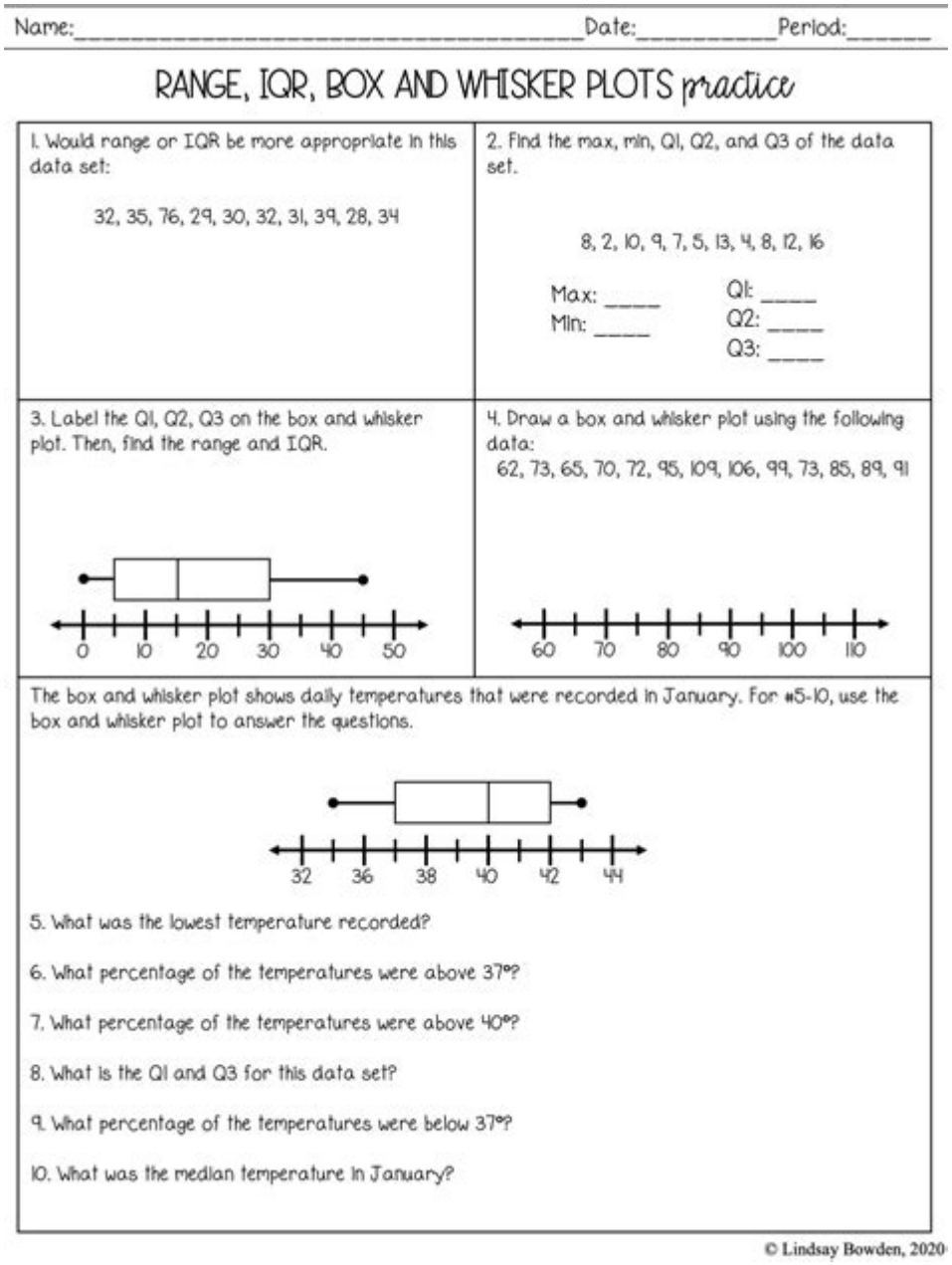
Box And Whisker Plot Worksheet 2 Answer Key



Name:_____ Date:_____ Period:_____

RANGE, IQR, BOX AND WHISKER PLOTS *practice*

1. Would range or IQR be more appropriate in this data set:

32, 35, 76, 29, 30, 32, 31, 39, 28, 34

2. Find the max, min, Q1, Q2, and Q3 of the data set.

8, 2, 10, 9, 7, 5, 13, 4, 8, 12, 16

Max: _____ Q1: _____
Min: _____ Q2: _____
Q3: _____

3. Label the Q1, Q2, Q3 on the box and whisker plot. Then, find the range and IQR.

0 10 20 30 40 50

4. Draw a box and whisker plot using the following data:
62, 73, 65, 70, 72, 95, 109, 106, 99, 73, 85, 89, 91

60 70 80 90 100 110

The box and whisker plot shows daily temperatures that were recorded in January. For #5-10, use the box and whisker plot to answer the questions.

32 36 38 40 42 44

5. What was the lowest temperature recorded?

6. What percentage of the temperatures were above 37°?

7. What percentage of the temperatures were above 40°?

8. What is the Q1 and Q3 for this data set?

9. What percentage of the temperatures were below 37°?

10. What was the median temperature in January?

Box and whisker plot worksheet 2 answer key is a valuable resource for students and educators aiming to understand and interpret this essential statistical tool. Box and whisker plots, also known as box plots, provide a visual summary of a data set's distribution, highlighting median values, quartiles, and potential outliers. In this article, we will explore the components and applications of box and whisker plots, how to create them, and ultimately provide an answer key for a hypothetical worksheet designed to reinforce these concepts.

Understanding Box and Whisker Plots

Box and whisker plots are graphical representations that summarize a data set's central tendency and variability. They are particularly useful for comparing distributions across different groups and identifying outliers.

Components of a Box and Whisker Plot

A box and whisker plot consists of the following key components:

1. Minimum Value: The smallest data point in the set that is not an outlier.
2. First Quartile (Q1): Represents the 25th percentile of the data, meaning that 25% of the data points fall below this value.
3. Median (Q2): The middle value of the data set, which divides the data into two equal halves.
4. Third Quartile (Q3): The 75th percentile, indicating that 75% of the data points fall below this value.
5. Maximum Value: The largest data point in the set that is not an outlier.
6. Whiskers: Lines that extend from the box to the minimum and maximum values.

Steps to Create a Box and Whisker Plot

To create a box and whisker plot, follow these steps:

1. Collect Data: Gather the numerical data that you want to analyze.
2. Order the Data: Arrange the data points in ascending order.
3. Calculate Quartiles:
- Identify the median (Q2).
- Determine Q1 (the median of the lower half of the data).
- Determine Q3 (the median of the upper half of the data).
4. Identify Outliers:
- Calculate the interquartile range (IQR = Q3 - Q1).
- Determine the lower and upper bounds for outliers:
- Lower Bound = Q1 - 1.5 IQR
- Upper Bound = Q3 + 1.5 IQR
5. Draw the Box: Create a box from Q1 to Q3, with a line at the median.
6. Add Whiskers: Extend lines from the box to the minimum and maximum values that are not outliers.
7. Plot Outliers: Represent any outliers as individual points outside the whiskers.

Applications of Box and Whisker Plots

Box and whisker plots are widely used in various fields, including:

- Education: To analyze student performance data and identify disparities.

- Business: For comparing sales data across different quarters or regions.
- Healthcare: To evaluate patient outcomes and treatment effectiveness.
- Research: For summarizing experimental data and identifying trends.

Advantages of Using Box and Whisker Plots

The benefits of box and whisker plots include:

- Simplicity: They provide a clear visual representation of data distribution.
- Comparative Analysis: Multiple box plots can be drawn side by side to compare different data sets effectively.
- Outlier Identification: They help in identifying outliers that may significantly impact analysis.

Limitations of Box and Whisker Plots

Despite their advantages, there are some limitations:

- Loss of Detail: Box plots summarize data, which may overlook specific characteristics of the data distribution.
- Assumption of Normality: They may not accurately represent data that are heavily skewed or have unusual distributions.

Box and Whisker Plot Worksheet 2: Sample Problems

To solidify understanding, let’s consider a sample worksheet with problems related to box and whisker plots. Below are hypothetical data sets and questions typically found on a worksheet.

Example Data Set 1: 12, 15, 14, 10, 8, 14, 16, 20, 25, 18

Questions:
1. Create a box and whisker plot for the data set.
2. Identify the median, quartiles, and any outliers.

Example Data Set 2: 23, 30, 25, 22, 34, 29, 31, 28, 25, 27

Questions:
1. Create a box and whisker plot for the data set.
2. Discuss the implications of the quartiles in the context of the data.

Box and Whisker Plot Worksheet 2 Answer Key

Now, let's provide the answers for the hypothetical box and whisker plot worksheet discussed above.

Answers for Example Data Set 1

1. Ordered Data: 8, 10, 12, 14, 14, 15, 16, 18, 20, 25
2. Median (Q2): The median is the average of the 5th and 6th values: (14 + 15)/2 = 14.5.
3. First Quartile (Q1): The median of the lower half (8, 10, 12, 14, 14) is 12.
4. Third Quartile (Q3): The median of the upper half (15, 16, 18, 20, 25) is 18.
5. Minimum Value: 8
6. Maximum Value: 25
7. Interquartile Range (IQR): IQR = Q3 - Q1 = 18 - 12 = 6.
8. Outliers:
- Lower Bound = Q1 - 1.5 IQR = 12 - 9 = 3.
- Upper Bound = Q3 + 1.5 IQR = 18 + 9 = 27.
- No outliers since all data points fall between 3 and 27.

The box and whisker plot would show a box from 12 to 18, with a median line at 14.5 and whiskers extending to 8 and 25.

Answers for Example Data Set 2

1. Ordered Data: 22, 23, 25, 25, 27, 28, 29, 30, 31, 34
2. Median (Q2): The median is the average of the 5th and 6th values: (27 + 28)/2 = 27.5.
3. First Quartile (Q1): The median of the lower half (22, 23, 25, 25, 27) is 25.
4. Third Quartile (Q3): The median of the upper half (28, 29, 30, 31, 34) is 30.
5. Minimum Value: 22
6. Maximum Value: 34
7. Interquartile Range (IQR): IQR = Q3 - Q1 = 30 - 25 = 5.
8. Outliers:
- Lower Bound = Q1 - 1.5 IQR = 25 - 7.5 = 17.5.
- Upper Bound = Q3 + 1.5 IQR = 30 + 7.5 = 37.5.
- No outliers since all data points fall between 17.5 and 37.5.

The box and whisker plot would show a box from 25 to 30, with a median line at 27.5 and whiskers extending to 22 and 34.

Conclusion

In conclusion, the box and whisker plot worksheet 2 answer key provides valuable insights into how to analyze and interpret data using box plots. By understanding the components, applications, and methods for creating these plots, students can enhance their statistical literacy and improve their ability to present data effectively. Whether in an educational setting or professional environment, mastering box and whisker plots is an essential skill for anyone working with data.

Frequently Asked Questions

What is a box and whisker plot used for?

A box and whisker plot is used to visually display the distribution of a dataset, showing its median, quartiles, and potential outliers.

How do you interpret the quartiles in a box and whisker plot?

The first quartile (Q1) marks the 25th percentile, the median (Q2) marks the 50th percentile, and the third quartile (Q3) marks the 75th percentile of the data.

What does the 'whisker' in a box and whisker plot represent?

The whiskers extend from the box to the smallest and largest values within 1.5 times the interquartile range (IQR), indicating the range of the data without outliers.

What are outliers in the context of a box and whisker plot?

Outliers are data points that fall below Q1 - 1.5 IQR or above Q3 + 1.5 IQR and are typically represented as individual points beyond the whiskers.

How do you calculate the interquartile range (IQR)?

The interquartile range (IQR) is calculated by subtracting the first quartile (Q1) from the third quartile (Q3): IQR = Q3 - Q1.

What is the significance of the median in a box and whisker plot?

The median divides the dataset into two equal halves, providing a measure of central tendency and indicating where the center of the data lies.

How can you use a box and whisker plot to compare two datasets?

You can compare two datasets by plotting them side by side, allowing you to easily see differences in medians, ranges, and the presence of outliers.

What are the steps to create a box and whisker plot from a dataset?

1. Organize the data in ascending order. 2. Calculate Q1, median, and Q3. 3. Determine the whiskers' range. 4. Draw the box from Q1 to Q3 with a line at the median and extend the whiskers.

What information does the length of the box in a box and whisker plot convey?

The length of the box represents the interquartile range (IQR) and indicates the variability of the

middle 50% of the data.

Where can I find the answer key for a box and whisker plot worksheet?

The answer key for a box and whisker plot worksheet can typically be found in the teacher's guide, educational resources websites, or by contacting the instructor.

Box And Whisker Plot Worksheet 2 Answer Key

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