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Making and Understanding Box and Whisker Plots - Step-by-Step Lesson

Problem: Draw the box and whisker plot for the data set:

40, 42, 28, 38, 41, 39, 40, 47, 44

Explanation:

Box and whisker plots contain 5 key pieces of data: The range, minimum, median, lower quartile, upper quartile, and maximum.

Step 1) Order the data and find the range. The data in order (lowest to highest) would be:

28, 38, 39, 40, 40, 41, 42, 44, 47

This means the range (highest to lowest) would be: 28-47.

We subtract the largest value by the smallest value: 47 – 28 = 19 (range)

Step 2) Find the median (middle number)

The median is the middle value. If there are an odd number of items, it is simple because there will be just one middle number. If there are an even number of items, we would average the two middle numbers. There are 9 pieces of data (odd), so the middle number will have 4 integers above and below it:

28, 38, 39, 40, **40**, 41, 42, 44, 47

Median can be determined by the equation: ½ (n + 1), n is the number of data values (9)

½ (9 + 1) = 5 or 5^{th} data value.

The median is: **40**

Step 3) Find the lower quartile:

The lower quartile is the median of the lower half of data. The lower half of the data consists of (28, **38, 39**, 40) When you have an even number of data, take the average of the middle number numbers = 38.5

Step 4) Find the upper quartile.

The upper quartile is the median of the upper half of data. The upper half of the data consists of (41, **42, 44**, 47). 43 is the median of lower half of the data set.

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Step 5) Find the average: 39.88. Add up all the data and divide by the number of pieces of data you have (9).

Step 6) It is time to visualize this data. We have all the values we need.

a) Make a range chart. (28 – 47)

b) Draw three large lines to indicate the minimum, maximum, and median (40).

c) Draw a box from the median to the lower quartile (38.5) and enclose the box.

d) Draw a box from the median to the upper quartile (43) and enclose the box.