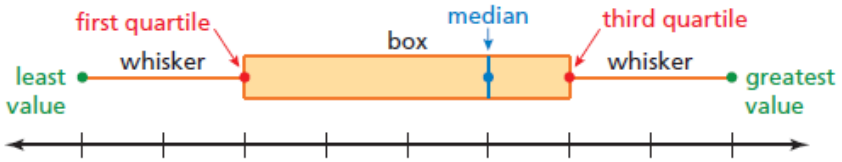
Indicator 39 Class Notes by Mrs. Joshi

Box-and-Whisker Plots

Key Idea

Box-and-Whisker Plots

A **box-and-whisker plot** displays a data set along a number line using medians. **Quartiles** divide the data set into four equal parts. The median (second quartile) divides the data set into two halves. The median of the lower half is the first quartile. The median of the upper half is the third quartile.

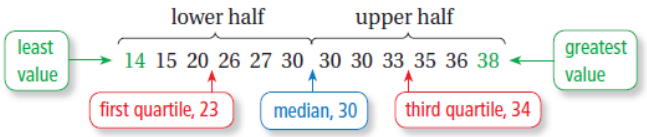


EXAMPLE 3 Making a Box-and-Whisker Plot

Make a box-and-whisker plot for the ages (in years) of the spider monkeys at a zoo.

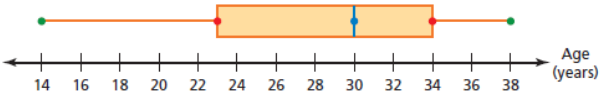
15, 20, 14, 38, 30, 36, 30, 30, 27, 26, 33, 35

Step 1: Order the data. Find the median and the quartiles.



Step 2: Draw a number line that includes the least and greatest values. Graph points above the number line for the least value, greatest value, median, first quartile, and third quartile.

Step 3: Draw a box using the quartiles. Draw a line through the median. Draw whiskers from the box to the least and greatest values.



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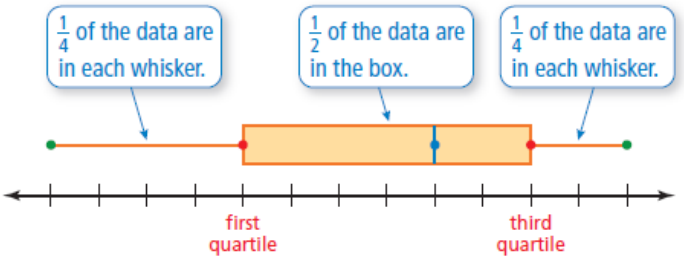
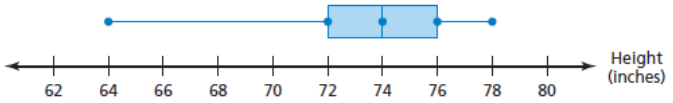
The figure shows how data are distributed in a box-and-whisker plot.



The **interquartile range** of a data set is the difference of the third quartile and the first quartile. It represents the range of the middle half of the data.

EXAMPLE 4 Analyzing a Box-and-Whisker Plot

The box-and-whisker plot shows the heights of the players on a basketball team.



a. What portion of the players are at least 76 inches tall?

The right whisker represents the players that are at least 76 inches tall.

∴ So, $\frac{1}{4}$ of the players are at least 76 inches tall.

b. Find and interpret the interquartile range of the data.

$$\begin{aligned}\text{interquartile range} &= \text{third quartile} - \text{first quartile}\\ &= 76 - 72\\ &= 4\end{aligned}$$

∴ So, the middle half of the heights vary by no more than 4 inches.

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Create a box and whisker of the following test scores.

65, 72, 80, 70, 68, 95, 75, 82, 85, 50, 90

Step 1: Put the data in order from least to greatest.

_____

Step 2: Find each of the five data points.

Find the median _____

Find the median of the upper half. (Upper quartile) _____

Find the median of the lower half. (Lower quartile) _____

Find the maximum _____ and minimum _____

Step 3: Draw the box and whisker plot.

- Draw and label a number line.
- Then, plot each of your five pieces of data on the number line.
- Finally, connect the quartiles and the median with a box. Draw a line from each quartile to the extremes.

Construct a box-and-whisker graph using the following data:

16, 12, 13, 14, 16, 18, 15, 17, 20, 12, 14, 15, 15

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(a) Arrange the following data from *least* to *greatest* and find the median.

20, 25, 24, 17, 18, 19, 21, 27

(b) Find the median of the upper half of the data. What is this called?

(c) Find the median of the lower half of the data. What is this called?

(d) Draw a box-and-whisker graph using the above information.

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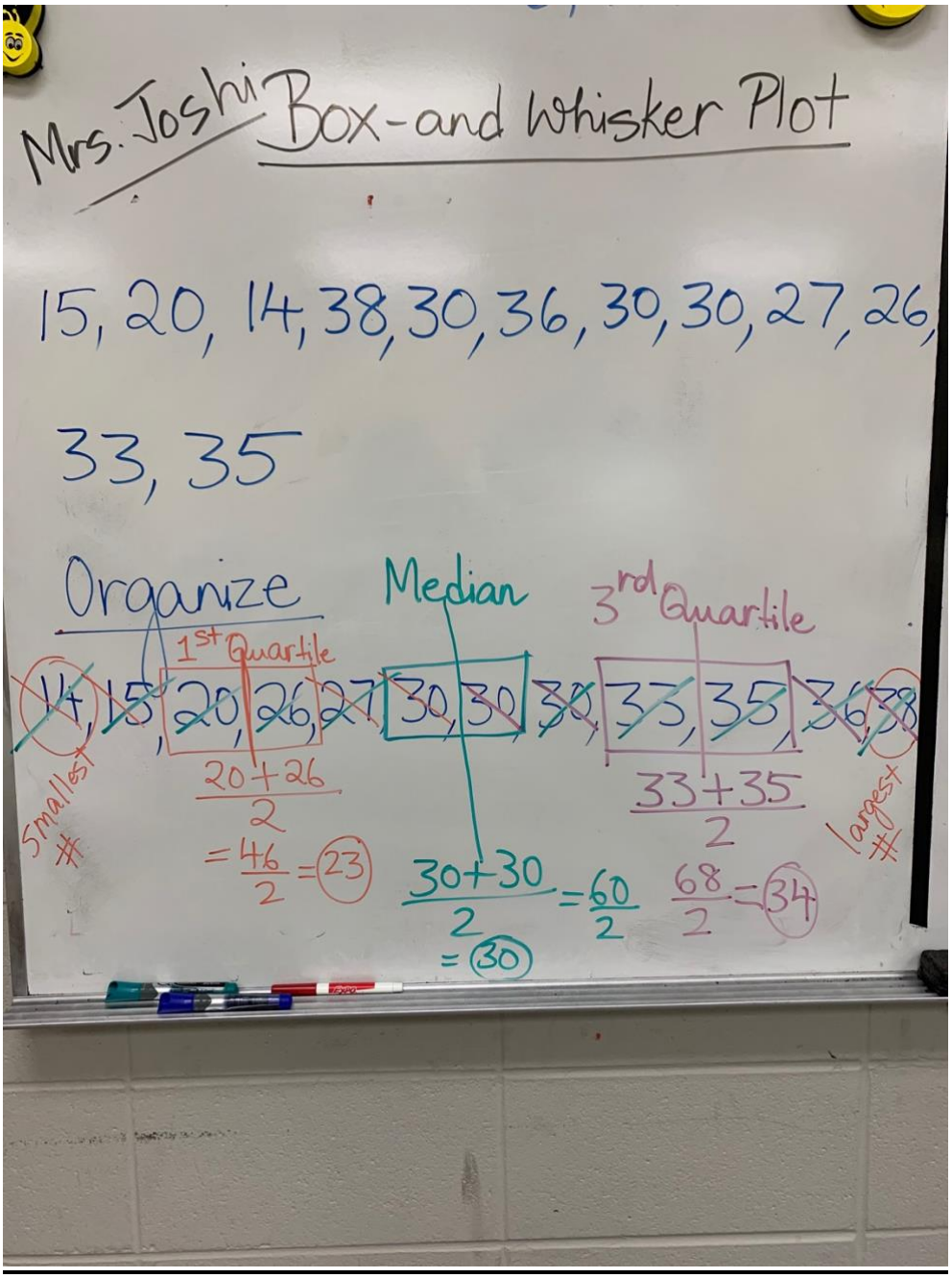

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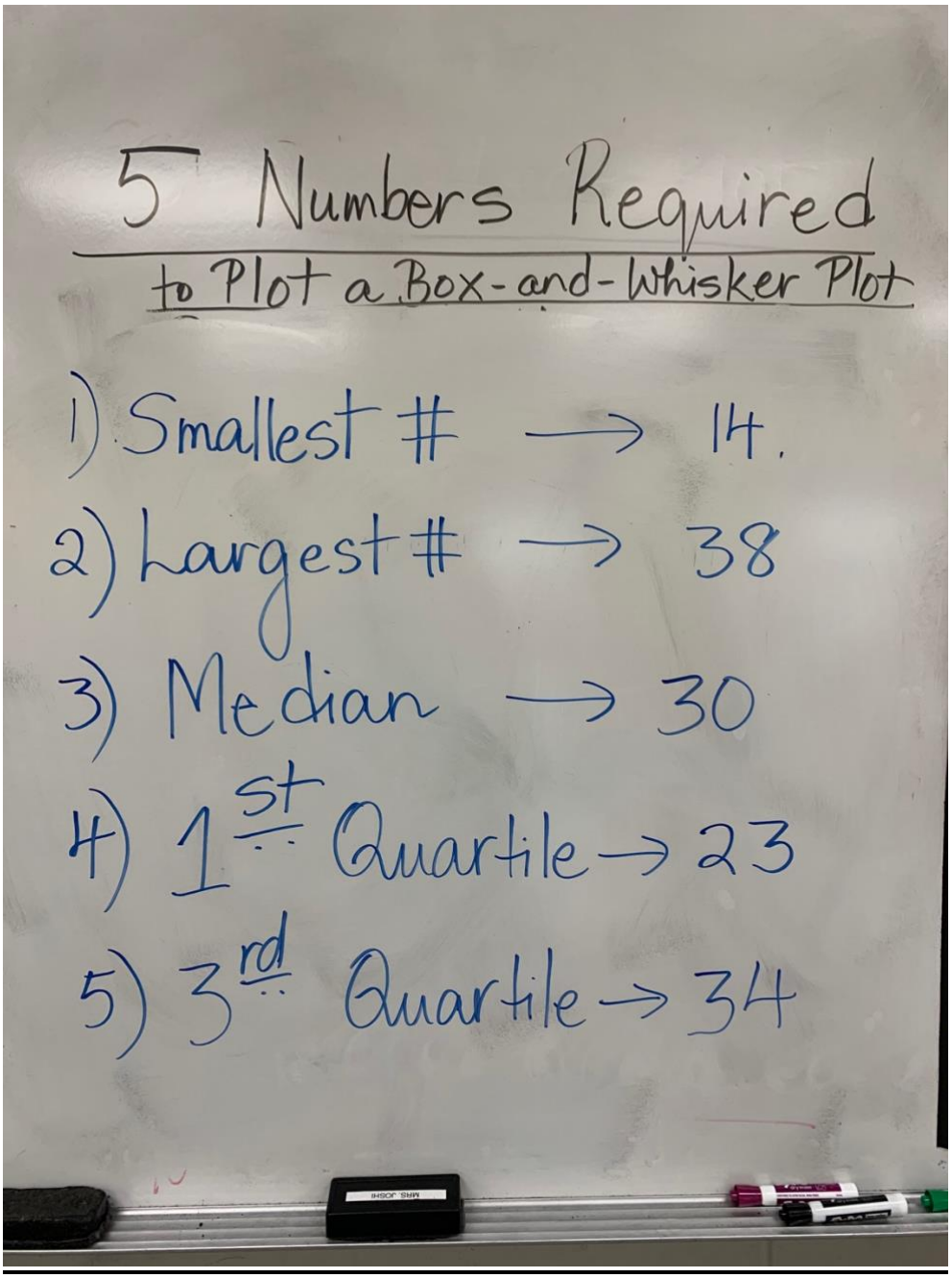

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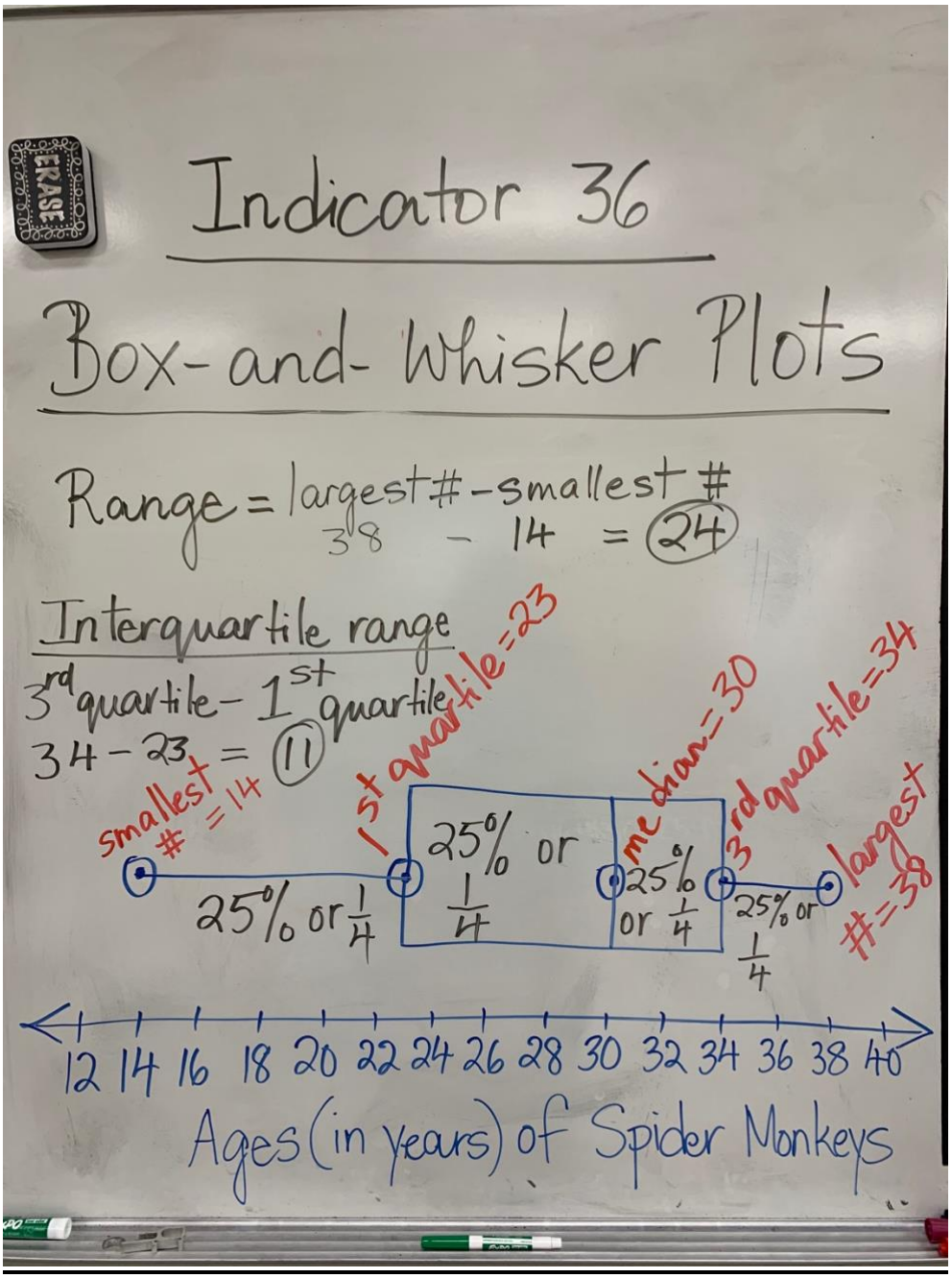

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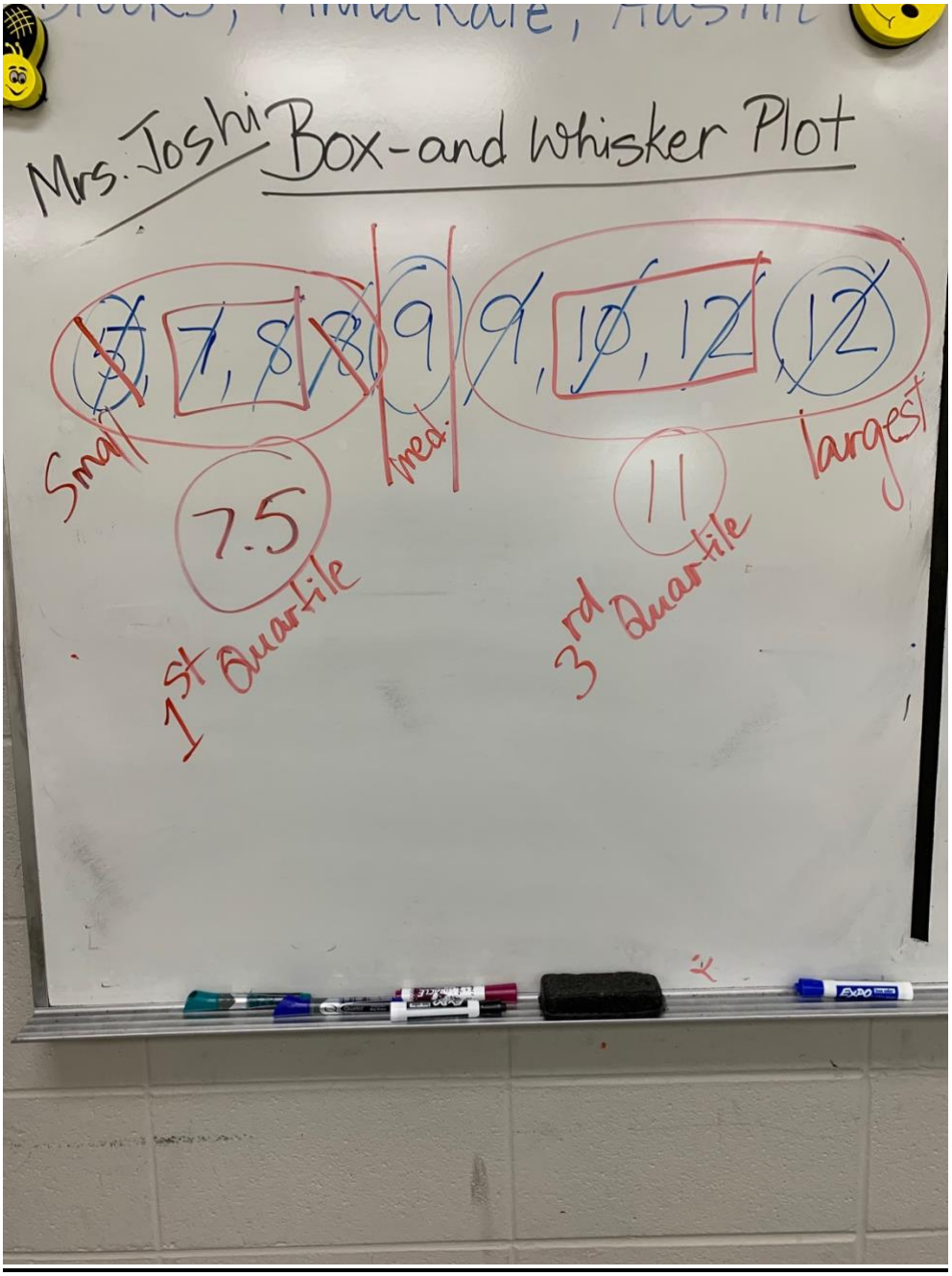

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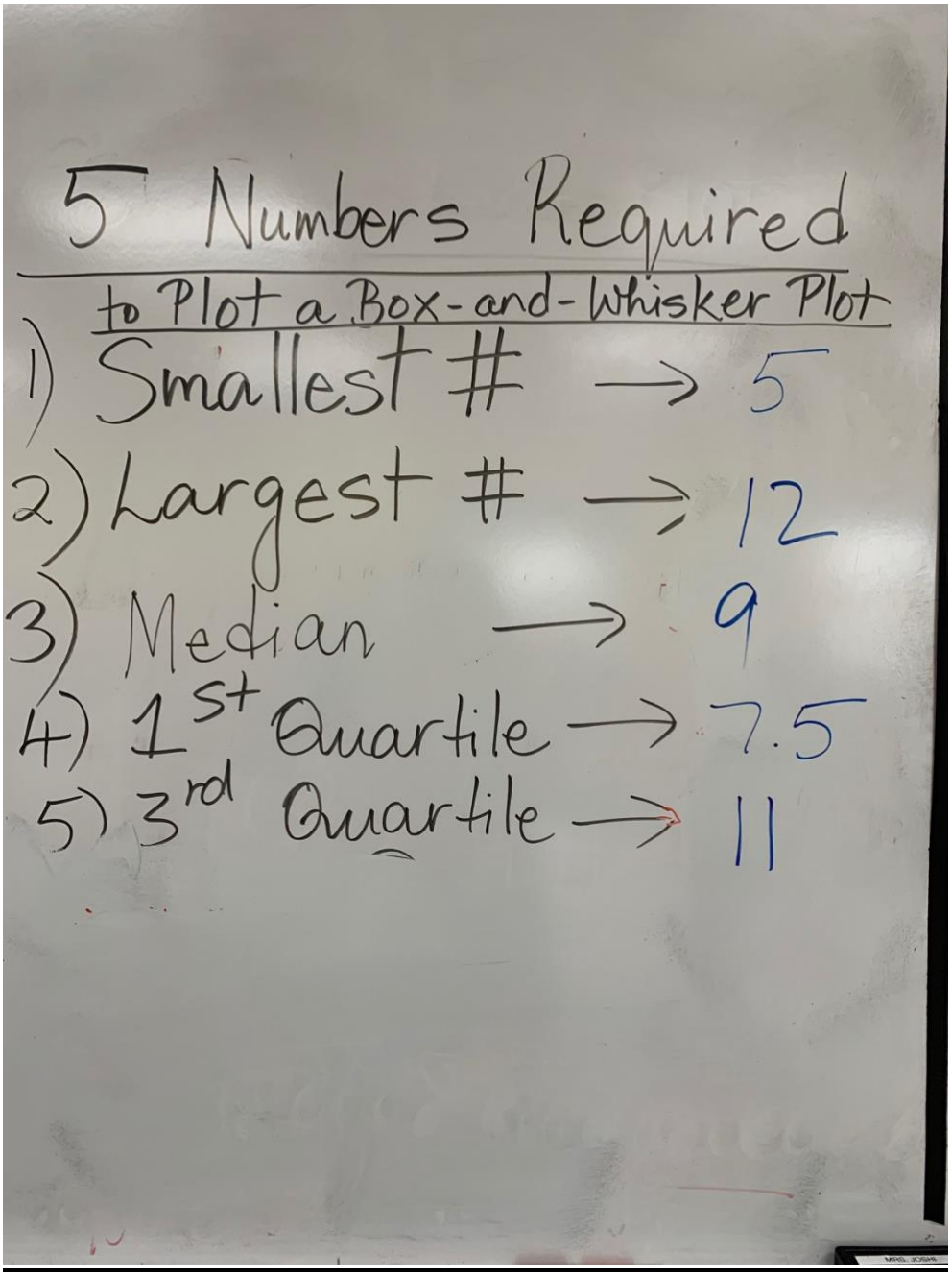

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