Measuring Center
Sections 2.1, 2.2, 2.3
Lecture 5

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Outline

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Measuring Center

- We expect the "middle" or "center" of a distribution to contain the "typical" or "representative" values in the data set.
- However, these are all vague concepts.
- We need to give them a precise meaning.
- And there is more than one way to define the middle of a distribution.

Outline

The Mean

Definition (Mean)

The mean of a data set is the average, that is, the sum of all the values divided by the number of values. The symbol for the mean is $\overline{x}$, pronounced "x bar."
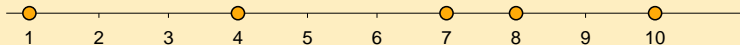
- The mean is the most common measure of center.
- If there are n values and we label them $x_1, x_2, \ldots, x_n$, then the mean is

$$\overline{x} = \frac{\sum x_i}{n}.$$
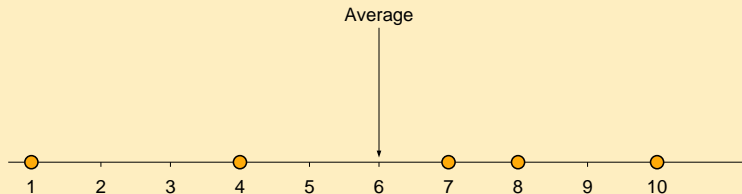
- The mean is the "balancing point" of the data.
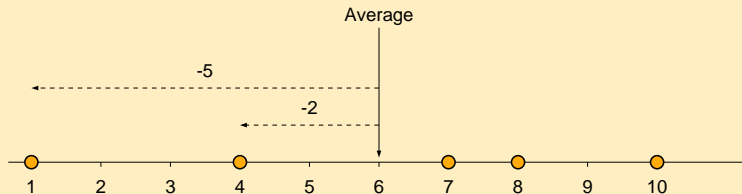
The Mean
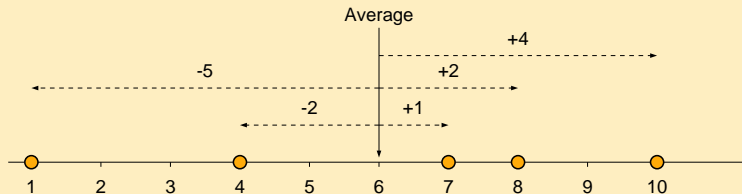
The Balancing Point

The Mean

The Balancing Point

The Mean

The Balancing Point

The Mean

The Balancing Point

Example

> **Example (The Mean)**
>
> Compute the average height of the students in this class.

Outline

The Mean on the TI-83

The Mean on the TI-83

- Enter the data into a list, say `L₁`.
- Press `STAT > CALC > 1-Var Stats`.
- Press `ENTER`. "`1-Var-Stats`" appears in the display.
- Type `L₁` and press `ENTER`.
- A list of statistics appears. The first one is the mean.

Example

Example (Rainfall Data)

- Rainfall data for August in Richmond, VA (1986 - 2015).

6.74	1.24	4.04	4.90	5.72	2.88
6.91	5.58	2.52	8.42	4.44	1.41
1.84	2.00	2.79	2.30	3.15	3.59
16.02	2.56	5.99	6.81	5.73	4.04
3.92	7.10	3.50	7.64	3.61	2.77

- Use the TI-83 to find the mean of the rainfall data.

Outline

The Median

Definition (Median)

The median of a data set is the number in the middle of the set. If there are n numbers in the set, then the middle number is in position
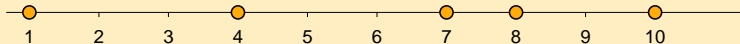
$$\frac{n+1}{2}.$$

If n is even, then we get a half integer which we interpret as indicating the number halfway between the middle two numbers.

- The median is a better measure of center than the mean when the data are strongly skewed.
- The median divides the data set into the lower half and the upper half; it is the halfway point.
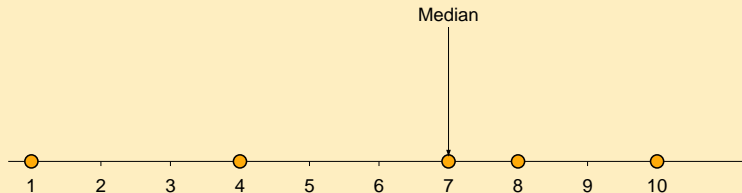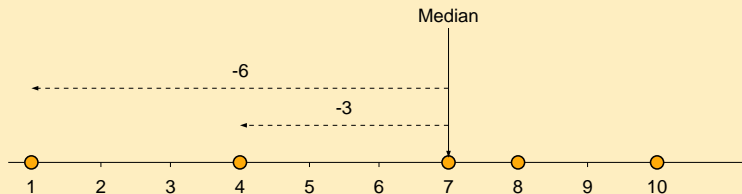
The Median

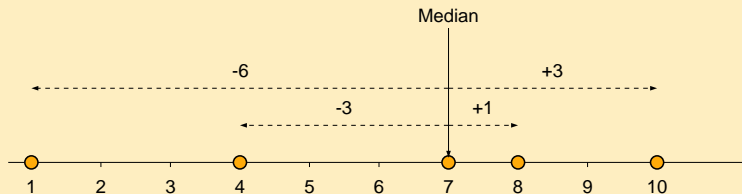## The Halfway Point

The Median

The Halfway Point

The Median

The Halfway Point

The Median

The Halfway Point

Example

> **Example (The Median)**
>
> Compute the median height of the students in this class.

Outline

The Median on the TI-83

The Median on the TI-83

- Follow the same procedure that was used to find the mean.
- When the list of statistics appears, scroll down to the one labeled "`Med`." It is the median.

Example

Example (Rainfall Data)

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- Use the TI-83 to find the median of the rainfall data.

Outline

- If the distribution is symmetric, then the mean and the median have the same value.

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- If the distribution is symmetric, then the mean and the median have the same value.
- If the data are skewed in one direction, then the mean and the median are pulled in that direction, but the mean is pulled further.
- For that reason, if the data are strongly skewed, then the median is more representative than the mean.
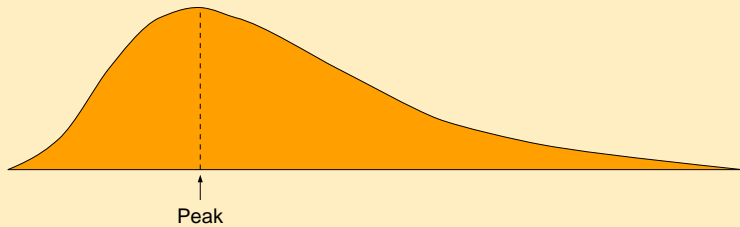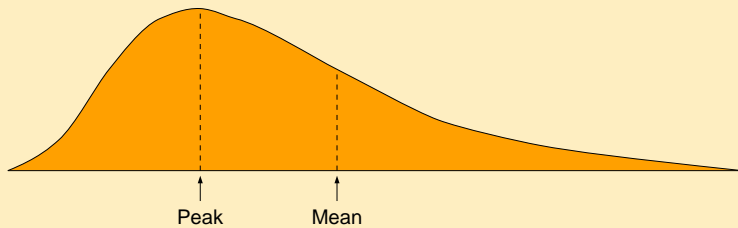
The Mean vs. the Median
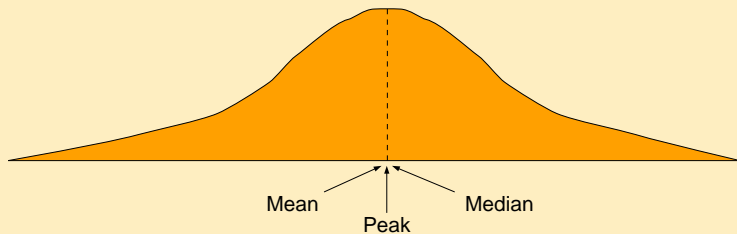
The Mean vs. the Median
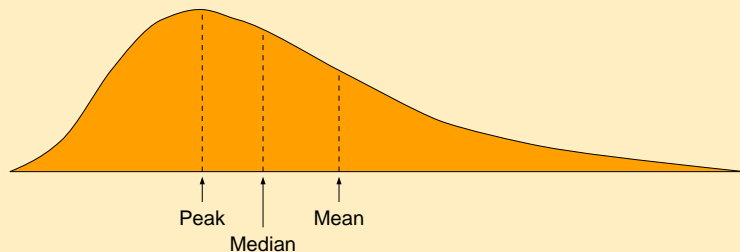
The Mean vs. the Median

The Mean vs. the Median

Peak

The Mean vs. the Median

The Mean vs. the Median

The Mean vs. the Median

Outline

Assignment

Assignment

- Read Section 2.1: Measuring Center: The Mean.
- Read Section 2.2: Measuring Center: The Median.
- Read Section 2.3: Comparing the Mean and the Median.
- Apply Your Knowledge: 2.1, 2.3, 2.4.
- Check Your Skills: –.
- Exercises: 2.25, 2.26.