


MISSOURI S&T MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

## Chapter 1

# Descriptive Statistics

1.1 Populations, Samples, and Processes  
 1.2 Pictorial and Tabular Methods in Descriptive Statistics  
**1.3 Measures of Location**  
 1.4 Measures of Variability




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## The (Sample) Mean

of observations  $x_1, x_2, \dots, x_n$  is given by

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$


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## Example

A sample of eight resistors of a certain type resulted in the following sample resistances (in ohm):

40, 43, 39, 35, 37, 43, 46, 37.

Find the **sample mean**.

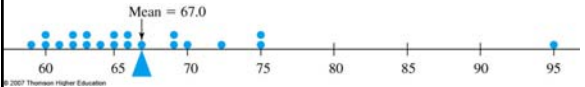


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## The Mean

can be viewed as a **balance point** for a system of weights:




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## The (Sample) Median $\tilde{x}$

is obtained by ordering the observations from smallest to largest and then

- taking the **middle value** if the sample size is **odd**
- taking the **average of the two middle values** if the sample size is **even**.



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## Example

A sample of (a) nine (b) eight resistors of a certain type resulted in the following sample resistances (in ohm):

(a) 40, 43, 39, 35, 37, 43, 46, 37, 36.  
 (b) 40, 43, 39, 35, 37, 43, 46, 37.

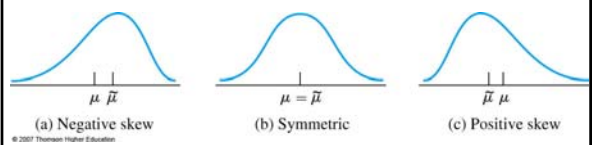
Find the **sample median**.



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## The Population Mean / Median

is the mean / median of **all** values in a population and is denoted by  $\mu / \tilde{\mu}$



## The p% Trimmed Mean

is obtained by removing the smallest p% and the largest p% of the data set and then taking the average of what is left over.

## Example

Copper content (in %) for a sample of certain artifacts:

- 2.0, 2.4, 2.5, 2.6, 2.6, 2.7, 2.7, 2.8, 3.0,
- 3.1, 3.2, 3.3, 3.3, 3.4, 3.4, 3.6, 3.6, 3.6,
- 3.6, 3.7, 4.4, 4.6, 4.7, 4.8, 5.3, 10.1.

Find the **sample mean**, the **sample median**, and the **7.7% trimmed mean**.

