3.5 Descriptive Measures, Population: **a Quick View**

GOALS:
1. Understand difference between a population and sample.
2. Learn formulas for mean and standard deviation for samples and recognize the formulas for populations.
3. Understand that z- scores represent the number of standard deviations away from the mean of an item of data.

Study 3.5, # 195(149), 196, 207(159), 215(167 z score)

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Statistics Home Page   Homework (old 3.4)

3.5 Descriptive Measures, Population

	SAMPLE	POPULATION
	STATISTICS	*PARAMETERS*
MEAN	$\bar{x} = \dfrac{\Sigma x_i}{n}$	$\mu = \dfrac{\Sigma x_i}{N}$
STD DEV	$S = \sqrt{\dfrac{\Sigma(x_i - \bar{x})^2}{n-1}}$	$\sigma = \sqrt{\dfrac{\Sigma(x_i - \mu)^2}{N}} = \sqrt{\dfrac{\Sigma x_i^2}{N} - \mu^2}$
VARIANCE	S^2	σ^2
MEDIAN	M	η

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3.5   Descriptive Measures, Population

Suppose: Tests are returned and your grade is a 71.

Class average is a 65, and the standard deviation is 18.0.

How many standard deviations is your grade from the mean?

What if your grade is 80 and the class standard deviation is 15.0?
How many standard deviations is your score from the mean?

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Statistics Home Page   Class Notes   Homework (old 3.4)

Ans: 0.33, 1.0

3.5   Descriptive Measures, Population

Suppose: Tests are returned and your grade is a 71.

Class average is a 65, and the standard deviation is 18.0

How many standard deviations is your grade from the mean?

$$z = \frac{x - \bar{x}}{s} = \frac{71 - 65}{18} = \frac{6}{18} = \frac{1}{3} = 0.33$$

Since this is positive, the grade of 71 is 0.33 standard deviations ABOVE the mean.

What if your grade is 80 and the class standard deviation is 15.0?
How many standard deviations is your score from the mean?

$$z = \frac{x - \bar{x}}{s} = \frac{80 - 65}{15} = \frac{15}{15} = 1.00$$

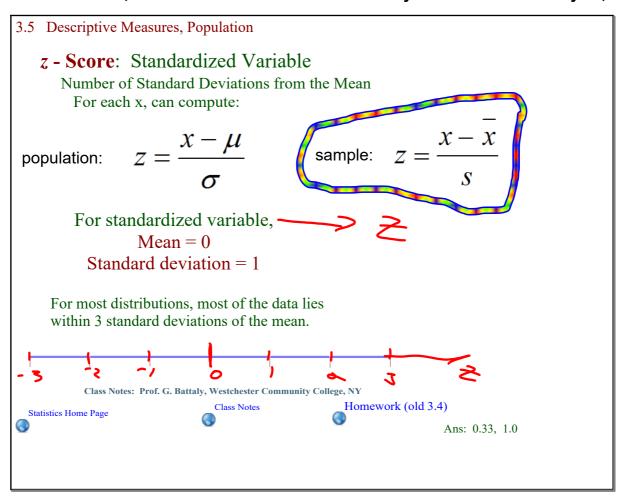Since this is positive, the grade of 80 is 1.00 standard deviations ABOVE the mean.

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Ans: 0.33, 1.0

3.5   Descriptive Measures, Population

z - **Score**: Standardized Variable

Number of Standard Deviations from the Mean
For each x, can compute:

population: $z = \dfrac{x - \mu}{\sigma}$ sample: $z = \dfrac{x - \bar{x}}{s}$

For standardized variable, $\longrightarrow$ $\gtrless$
Mean = 0
Standard deviation = 1

For most distributions, most of the data lies
within 3 standard deviations of the mean.

-3   -2   -1   0   1   2   3

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Ans: 0.33, 1.0