

# Review for Exam #1

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## Chapter 1

### Population

the complete collection of elements (scores, people, measurements, etc.) to be studied

### Sample

a subcollection of elements drawn from a population

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## The Nature of Data

### Definitions

#### Quantitative data

numbers representing counts or measurements

#### Qualitative (attribute) data

nonnumeric data that can be separated into different categories (categorical data)

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# Definitions

**Discrete - Countable**

**Continuous - Measurements with no gaps**

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# Levels of Measurement

**Nominal - names only**

**Ordinal - names with some order**

**Interval - differences but no 'zero'**

**Ratio - differences and a 'zero'**

**2**

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# Critical Thinking

- ❖ Voluntary Response Samples
- ❖ Small Samples
- ❖ Graphs
- ❖ Pictographs
- ❖ Percentages
- ❖ Loaded Questions
- ❖ Order of Questions
- ❖ Refusals
- ❖ Etc.

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# Methods of Sampling

Random

Systematic

Convenience

Stratified

Cluster

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# Chapter 2

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## Determine the Definition Values for this Frequency Table

Quiz Scores	Frequency
0-4	2
5-9	5
10-14	8
15-19	11
20-24	7

❖ Classes

❖ Lower Class Limits

❖ Upper Class Limits

❖ Class Boundaries

❖ Class Midpoints

❖ Class Width

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## Frequency Tables

Regular Freq. Table		Relative Freq. Table		Cumulative Freq. Table	
Axial Load	Frequency	Axial Load	Relative Frequency	Axial Load	Cumulative Frequency
200 - 209	9	200 - 209	0.051	Less than 210	9
210 - 219	3	210 - 219	0.017	Less than 220	12
220 - 229	5	220 - 229	0.029	Less than 230	17
230 - 239	4	230 - 239	0.023	Less than 240	21
240 - 249	4	240 - 249	0.023	Less than 250	25
250 - 259	14	250 - 259	0.080	Less than 260	39
260 - 269	32	260 - 269	0.183	Less than 270	71
270 - 279	52	270 - 279	0.297	Less than 280	123
280 - 289	38	280 - 289	0.217	Less than 290	161
290 - 299	14	290 - 299	0.080	Less than 300	175

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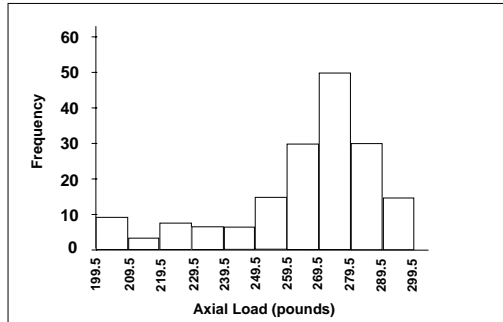
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## Histogram of Axial Load Data



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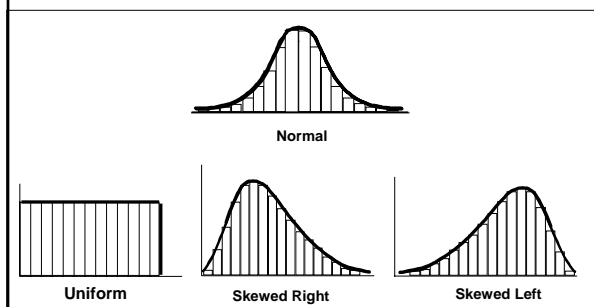
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## Important Distributions




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## Stem-Leaf Plots

10 11 15 23 27 28 38 38 39 39  
40 41 44 45 46 46 52 57 58 65

Stem	Leaves
1	015
2	378
3	8899
4	014566
5	278
6	5

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## Measures of Center

Mean

Median

Mode

Midrange

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## Calculator Basics for Statistical Data

1. Put calculator into statistical mode
2. Clear previous data
3. Enter data (and frequency)
4. Select key(s) that calculate  $\bar{x}$

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## Mean for a Frequency Table

Quiz Scores	Midpoints	Frequency
0-4	2	2
5-9	7	5
10-14	12	8
15-19	17	11
20-24	22	7

$\bar{x} = 14.4$   
(rounded to one more decimal place than data)

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## Measure of Variation

### Range

$$\text{highest score} - \text{lowest score}$$

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## Measure of Variation

### Standard Deviation

a measure of variation of the scores  
about the mean

(average deviation from the mean)

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# Measure of Variation

## Variance

standard deviation squared

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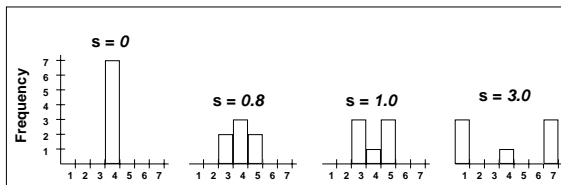
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### Same Means ( $\bar{x} = 4$ ) Different Standard Deviations



Standard Deviation

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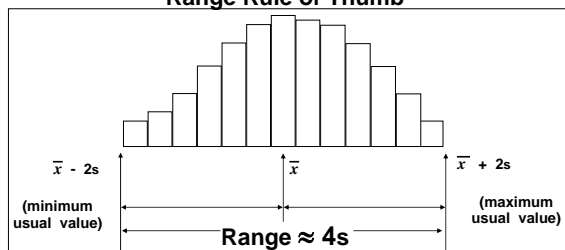
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### Estimation of Standard Deviation Range Rule of Thumb



$$s \approx \frac{\text{Range}}{4} = \frac{\text{highest value} - \text{lowest value}}{4}$$

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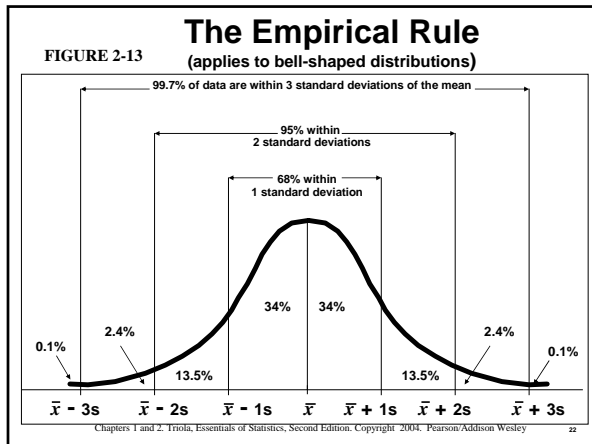
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**Measures of Position**  
**Z score**

<b>Sample</b>	<b>Population</b>
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$$z = \frac{x - \bar{x}}{s}$$

$$z = \frac{x - \mu}{\sigma}$$

**Round to 2 decimal places**

Chapters 1 and 2, Triola, Essentials of Statistics, Second Edition, Copyright 2004, Pearson/Addison Wesley 23

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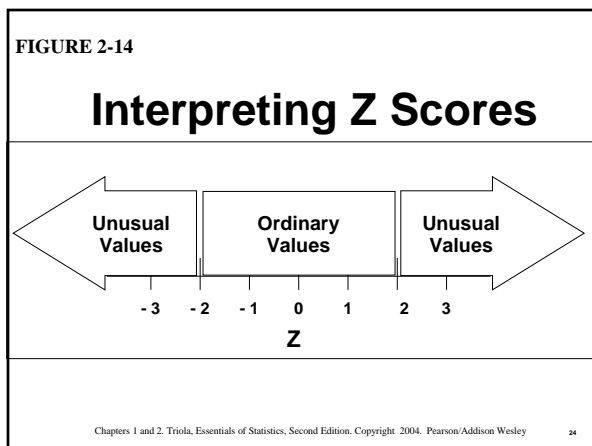
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# Other Measures of Position

## Quartiles and Percentiles

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## Finding the Percentile of a Given Score

$$\text{Percentile of score } x = \frac{\text{number of scores less than } x}{\text{total number of scores}} \cdot 100$$

200 201 204 206 206 208 208 209 215 217 218

$$\text{percentile of } 204 = \frac{2}{11} \cdot 100 = 18$$

**204 is the 18th percentile**

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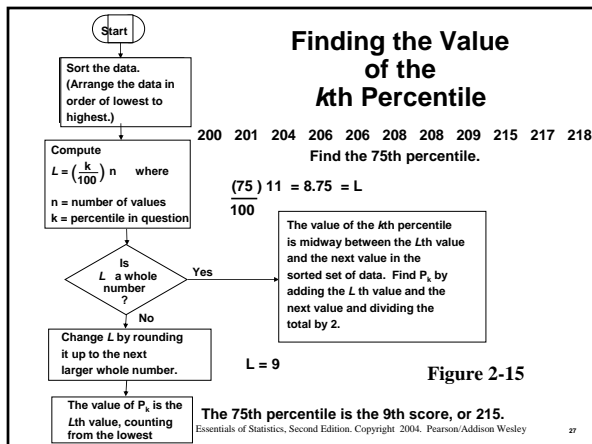
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# Quartiles

$$Q_1 = P_{25}$$

$$Q_2 = P_{50}$$

$$Q_3 = P_{75}$$

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# Boxplot

pulse rates (beats per minute) of smokers  
 52 52 60 60 60 60 63 63 66 67 68  
 69 71 72 73 75 78 80 82 83 88 90

## 5 - number summary

- ❖ Minimum - 52
- ❖ first quartile Q1 - 60
- ❖ Median - 68.5
- ❖ third quartile Q3 - 78
- ❖ Maximum - 90

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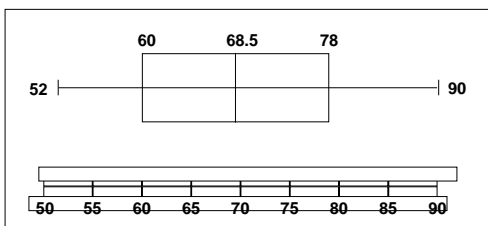
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# Boxplot

## Box-and-Whisker Diagram




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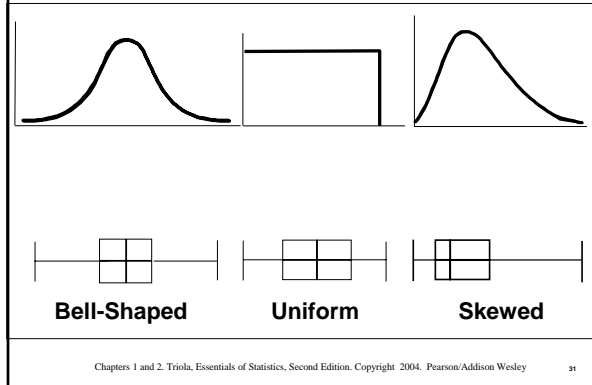
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Figure 2-17

# Boxplot



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