Chapter 15

15-1 Presenting Statistical Data

Frequency distribution: a table that shows how many times each data item occurs.
Histogram: a bar graph displaying a frequency distribution
Stem and leaf plot: A way of displaying the data in a frequency distribution.
Statistics: the methods used to describe a set of data.
Mode: the number that occurs most frequently
Median: the middle number in a distribution (which must be sorted in order) or the mean of the two middle numbers
Mean: the arithmetic average of the numbers in a deviation of a distribution. The sum of all the data items divided by the number of data items.

15-2 Analyzing statistical Data Part 1

First quartile: the median of the lower half of the data
Third quartile: the median of the upper half of the data

Q_1 = The median between the minimum and the median
Q_3 = The median between the median and the maximum

Range = Maximum – Minimum

Box and whisker plot: is used to show the median, the first and third quartiles, and the range of a distribution.

15-2 Analyzing Statistical Data part 2

Variance: one of the statistics used to measure the dispersion or "spread" of the data.
Standard deviation: the other statistic used to measure the dispersion or "spread" of the data. (The square root of the variance.)

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

Variance = $$\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \ldots + (x_n - \bar{x})^2}{n}$$

Variance = $\sigma^2 = \dfrac{\sum_{i=1}^{n} (\overline{x} - x_1)^2}{n}$

Standard deviation = $\sigma = \sqrt{\dfrac{\sum_{i=1}^{n} (\overline{x} - x_1)^2}{n}}$

$$\sigma = \sqrt{\frac{\text{sum of the squares of the deviations from the mean}}{\text{number of elements in the distribution}}} = \sqrt{\text{variance}}$$

Statistical Symbols and Variables:

$\overline{x}$ = The mean of the x values

$\sum_{i=1}^{n} x$ = The sum of the x values

σ^2 = The variance of the x values

n = The number of elements in the distribution

15-5 Fundamental Counting Principles

Outcome: the result
Event: a subset of outcomes
Compound event: several events which occur together

The Fundamental Counting Principle
In a compound event in which the first event may occur in n_1 ways, the second event may occur in n_2 ways, etc. The kth event may occur in the n_k different ways, so the total number of ways the compound event may occur is:

$$n_1 \bullet n_2 \bullet n_3 \bullet \ldots \bullet n_k$$

Mutually exclusive choices: you can do one or the other but not both at the same time. The outcome of mutually exclusive choices is the **SUM** of each outcome.

15-6 Permutations (order, arrange)

Permutation: An arrangement of the elements of a set of definite order.
Ordered Arrangement: A permutation of a set of objects

$${}_nP_n = n!$$

$$n! = n \bullet (n-1) \bullet (n-2) \bullet \ldots \bullet 3 \bullet 2 \bullet 1$$

$${}_nP_r = \frac{n!}{(n-r)!}$$

$$P = \frac{n!}{n_1!n_2!\ldots}$$ Where objects. n_1, n_2, etc., are repeated objects.

15-7 Combinations (choose, select)

The number of combinations of a set of **n** objects taken **r** at a time is:

$$\binom{n}{r} = {}_nC_r = \frac{n!}{r!(n-r)!}$$