Bivariate Data

-Bivariate data are data with _2_ variables.

-It consists of pairs of _linked_ numerical observations, or _frequencies_ of things in _categories_

-Numerical Bivariate data can be presented as _ordered_ _pairs_. Ordered pairs can be presented in a _table_ of values, as a _graph_ on the coordinate plane, or simply as a set of ordered pairs.

-Give examples of Categorical Bivariate data:
Age vs Height
Gender vs sports

Data from two categories often uses a _Two_ - _way_ _Frequency chart_

-Each _Category_ is considered a _Variable_, and the categories serve as _labels_ in the chart.

-Two-Way Frequency Charts are made of _cells_.

-The number in each _cell_ is the _frequency_ of things that fit both the _row_ and _column_ categories for the cell.

Example: At a local shopping center 34 females and 23 males were asked which of the two major political parties they preferred. Eighteen females and 12 males preferred Labor. Display these data in a two-way frequency table.

Party Preference	Female	Male	Total
Labor	18	12	30
Liberal	16	11	27
Total	34	23	57

-The _categories_ are the values that are _names_ or _labels_.
-Name the categories in the example above: Gender vs political party
⭐-Entries in the _body_ of a two-way frequency table are called _joint frequencies_
-List the joint frequencies in the example above:
⭐-Entries in the _bottom_ row and _right_ column are called _Marginal Frequencies_
-List the marginal frequencies in the example above: total

A _conditional_ relative frequency is found by dividing the _joint_ frequency by the _Marginal_ frequency. The marginal frequency depends on what is _given_ to you in the problem.

Conditional relative frequencies are used to find conditional _probabilities_.

Example: This two-way table shows the favorite leisure activities for 50 adults - 20 men and 30 women.

	D	S	TV	
Men	2	10	8	20
Women	16	6	8	30
Total	18	16	16	50

a.) Fill in the table with relative frequencies: → part ÷ whole

	D	S	TV	
Men	2/50 .04	.20	.16	.40
Women	16/50 .32	.12	.16	.60
Total	.36	.32	.32	1

b.) Calculate conditional frequencies relative to gender: part ÷ gender total

	D	S	TV	Total
Men	2/20 = .10	.50	.40	1
Women	16/30 = .53	.20	.27	1

c.) Calculate conditional frequencies relative to Leisure Activity: part ÷ LA total

	D	S	TV	Total
Men	2/18 = .11	.63	.50	
Women	16/18 = .89	.38	.50	
Total	1	1	1	

Calculating Probabilities/Percentages:
You will be asked to find probabilities or percentages based on the _INFORMATION_ in a table.

When calculating conditional probabilities you have to keep in mind 2 things:
1. Underline the given population
2. Look for: "% of ___" "out of ___"
   "Given that..." "Looking at..."

Formula for calculating conditional probabilities:

$$\frac{\text{joint freq.}}{\text{marginal freq.}}$$

Formula for calculating conditional probabilities:

Examples: Referring to the example above, answer the following questions:

1. What percent of people enjoy sports? $\frac{16}{50}$ = .32 or 32%

2. What percent of women enjoy TV? $\frac{8}{30}$ = .27 or 27%

3. Find the probability that a man prefers to dance. $\frac{2}{50}$ = .04 or 4%

4. Given that you are a man, what is the probability that you prefer to dance?

$\frac{2}{20}$ = .10 or 10%

5. What percent of men prefer to dance?

$\frac{2}{20}$ = .10 or 10%