

8C – Frequency Tables

❖ Vocabulary, Formulas, Theories:

- **Two Way Frequency Table:** a visual representation in the form of a table that shows a relationship between two categories

	Sport Utility Vehicle (SUV)	Sports Car	Totals
male	21	39	60
female	135	45	180
Totals	156	84	240

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- **Probabilities from a Two Way Frequency Table:** there are three types of probabilities that can be found using this type of table.
 - **Joint Probability:** probability that is calculated using the values in the “body” of the table.
 - **Marginal Probability:** probability that is calculated using the sum or total cells of the table.
 - **Conditional Probability:** probability that is calculated by on the assumption that some event has already occurred.

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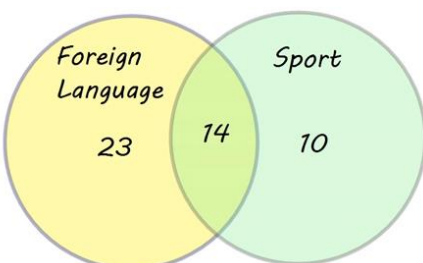
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- **Conditional Probability:** a probability that is calculated based on the assumption that some event has already occurred. It follows a certain notation. For example, the probably of Event B happening given that Event A has occurred is written as $P(B | A)$.

For any two events A and B , the probability of B occurring, given that event A has occurred, is $P(B | A) = \frac{P(A \text{ and } B)}{P(A)}$, where $P(A) \neq 0$.

📺 Video - "Conditional Probability with 2 Way Tables" - Mrs. Loveridge (11:19)

EX1) Use the information in the Venn Diagram to create a two way frequency table.



	Play a Sport	Do not play a sport	Total
Takes a foreign language			
Does not take a foreign language			
Total			

EX2) Use the information in the two way frequency table to find the probabilities:

Joint Probability

- a) $P(\text{female that works at the hospital})$
- b) $P(\text{male that works at the library})$

Marginal Probability

- c) $P(\text{animal shelter})$
- d) $P(\text{female})$

Conditional Probability

- e) $P(\text{animal shelter} \mid \text{female})$
- f) $P(\text{male} \mid \text{library})$

Mixed Probability

- g) $P(\text{male})$
- h) $P(\text{hospital})$
- i) $P(\text{female and animal shelter})$
- j) $P(\text{library} \mid \text{male})$
- k) $P(\text{female} \mid \text{hospital})$
- l) $P(\text{male and animal shelter})$

	Males	Females	Total
Animal Shelter	78	63	141
Hospital	39	52	91
Library	27	41	68
Total	144	156	300

Video - ["Conditional Probability Using a Table \(short version\)" - Daryl Stephens \(6:30\)](#)

EX3) A group of 262 students were polled and asked the question, "If you drink soda, do you prefer a diet version?" The responses of those who did drink soda are shown in the two way frequency table below. Use it to determine the unknown probabilities.

Prefer diet?	Female	Male	All
No	72	96	168
Yes	58	36	94
All	130	132	262

- a) If you chose a person from the survey at random, what is the probability that the person was female?
- b) If you chose a person from the survey at random, what is the probability that the person preferred a diet soda?
- c) If you chose a person from the survey at random, what is the probability that the person was a female who preferred a diet soda?

Conditional Probability

- d) If you chose a person from the survey at random, what is the probability that the person is female, given that the person preferred diet soda?
- e) If you chose a person from the survey at random, what is the probability that the person preferred diet soda, given that the person is female? What if it was given that the person is male?
- f) If you chose a person from the survey at random, what is the probability that the person did not prefer diet soda, given that the person is male?

❖ Extra Resources:

<https://www.youtube.com/watch?v=fD9Rxxt5hQ>

https://www.youtube.com/watch?v=etHW5Fz_4Oo

<https://www.youtube.com/watch?v=tTvtssS13EA>