Algebra I Two-Way Tables

EQ: How do you construct and interpret two-way frequency tables of data when two categories are associated with each object being classified?

A two-way table is a useful way to organize data that can be categorized by two variables. Suppose you asked 20 children and adults whether they liked broccoli. The table shows one way to arrange the data.

Frequency Table

	Yes	No
Children	3	8
Adults	7	2

The joint relative frequencies are the values in each category divided by the total number of values. Each value is divided by _____, the total number of individuals.

	Yes	No
Children	3/20=**0.15**	
Adults		

Joint Frequencies are _____

The marginal relative frequencies are found by adding the joint relative frequencies in each row and column.

	Yes	No	**Total**
Children	0.15	0.4	0.15+0.4=**0.55**
Adults	0.35	0.1	
Total	0.15+0.35=**0.5**		

Marginal Frequencies are _____

Example 1: The table shows the results of randomly selected car insurance quotes for 125 cars made by an insurance company in one week. Make a table of the joint and marginal relative frequencies.

	Teen	Adult
0 accidents	15	53
1 accident	4	32
2+ accidents	9	12

Check it out!

The table shows the number of books sold at a library sale. Make a table of the joint and marginal relative frequencies.

	Fiction	Nonfiction
Hardcover	28	52
Paperback	94	36

To find a **conditional relative frequency**, divide the joint relative frequency by the marginal relative frequency. Conditional relative frequencies can be used to find conditional probabilities.

Example 2: A reporter asked 150 voters if they plan to vote in favor of a new library and a new arena. The table shows the results.

		Library	
		Yes	No
Arena	Yes	21	30
	No	57	42

A. Make a table of the joint and marginal relative frequencies.

B. If you are given that a voter plans to vote no to the new library, what is the probability the voter also plans to say no to the new arena?

Check it out!

The classes at a dance academy include ballet and tap dancing. Enrollment in these classes is shown in the table.

		Ballet	
		Yes	No
Tap	Yes	38	52
	No	86	24

A. Copy and complete the table of the joint relative frequencies and marginal relative frequencies.

		Ballet		
		Yes	No	Total
Tap	Yes			
	No			
	Total			1

B. If you are given that a student is taking ballet, what is the probability that the student is also not taking tap?

Example 3: A company sells items in a store, online, and through a catalog. A manager recorded whether or not the 50 sales made one day were paid for with a gift card.

	Gift Card	Another Method
Store	𝍸 |	𝍸 ||||
Online	𝍸 ||||	𝍸 𝍸 |||
Catalog	𝍸	𝍸 |||

Use conditional probabilities to determine for which method a customer is most likely to pay with a gift card.

P(gift card if in store)

P(gift card if online)

P(gift card if by catalog)

Check it out!

Francine is evaluating three driving schools. She asked 50 people who attended the schools whether they passed their driving tests on the first try. Use conditional probabilities to determine which is the best school.

	Pass	Fail
Al's Driving	14	8
Drive Time	11	7
Crash Course	5	5