

Good morning!

1. "Here"
2. Finish comparing data
3. Notes on two-way tables

### Two Way Frequency Tables

A **two way table** is a useful way to organize data that can be categorized by two variables.

Below is an example of a two way frequency table.

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

One variable is shown on the top while the other is on the far left side.

The frequencies (counts) in the middle are known as **joint frequencies** – they join the two variables together.

The frequencies (counts) on the bottom and far right are known as **marginal frequencies** – they tell you the total for each category.

The bottom right gives you the grand total of the frequencies. It is equal to the sum of the totals for each variable.

The following table shows the results of a poll of randomly selected high school students and their preference for either math or English. Before answering the questions below, calculate the marginal frequencies and grand total.

	9 <sup>th</sup> Grade	10 <sup>th</sup> Grade	11 <sup>th</sup> Grade	12 <sup>th</sup> Grade	Total
Math	10	12	11	8	41
English	12	11	8	8	39
Total	22	23	19	16	80

Joint Frequ

1. How many students are in 11<sup>th</sup> grade?

19

3. How many students prefer English and are in 12<sup>th</sup> grade?

8

2. How many students are in 9<sup>th</sup> grade and prefer math?

10

4. How many students are there total?

80

Two Way Frequency Tables Practice

1) The table below shows the results from a survey given to freshmen at Harrison. Fill in the missing values into the table below and then answer the following questions:

9<sup>th</sup> Grader's School Transportation Survey

	Male	Female	Total
Walk	34	46	80
Car	28	17	45
Bus	15	12	27
Bike	52	17	69
Total	129	92	221

a. How many students are there total?

221

b. How many 9<sup>th</sup> boys walk to school?

34

c. How many 9<sup>th</sup> girls ride their bike to school?

17

d. How many males took the survey?

129

2) The table below represents the favorite meals of 9<sup>th</sup> and 10<sup>th</sup> graders. Use the table to answer the following questions.

		Favorite Meals of Students				
		Burgers	Chicken Nuggets	Pizza	Salad Bar	Total
Grade Level	9th grade	4	1	3	5	13
	10th grade	3	7	3	4	17
	Total	7	8	6	9	30

a. How many 9<sup>th</sup> graders participated in the survey?

13

d. Which meal is the least favorite of all students?

Pizza

b. How many students prefer chicken nuggets?

8

e. Which meal is the least favorite of 9<sup>th</sup> graders?

Ch.nug.

c. How many students prefer burgers?

7

f. Which meal is most favorite of 10<sup>th</sup> graders?

ch.nug.

Relative Frequencies

A **relative frequency** is the frequency that an event occurs divided by the total number of events.

Example: If your team has won 9 games from a total of 12 games played...

The **frequency** of winning is 9.  
 The **percent** of games won is 75%.  
 The **relative frequency** of winning is  $9/12 = 3/4 = .75$ .

Below is the two-way frequency table that we initially looked at. It shows the results of a poll of randomly selected high school students and their preference for either math or English.

	9 <sup>th</sup> Grade	10 <sup>th</sup> Grade	11 <sup>th</sup> Grade	12 <sup>th</sup> Grade	Total
Math	10	12	11	8	41
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Total	22	23	19	16	80

On the table below, use the information from the original table to calculate the joint relative frequencies and marginal relative frequencies.

To calculate **joint relative frequencies**, take each joint frequency and divide by the grand total. Round to the nearest thousandth for this example.

To calculate **marginal relative frequencies**, find the sum of the joint relative frequencies for each row and column. Round to the nearest thousandth for this example.

	9 <sup>th</sup> Grade	10 <sup>th</sup> Grade	11 <sup>th</sup> Grade	12 <sup>th</sup> Grade	Total
Math	$\frac{10}{80} = \frac{1}{8} = .125$	$\frac{12}{80} = \frac{3}{20} = .15$	$\frac{11}{80} = .138$	$\frac{8}{80} = \frac{1}{10} = .1$	<del>.50</del> <u>.513</u>
English	$\frac{12}{80} = .15$	$\frac{11}{80} = .138$	$\frac{8}{80} = .1$	$\frac{8}{80} = .1$	<u>.487</u>
Total	<u>.275</u>	<u>.288</u>	<u>.238</u>	<u>.2</u>	<del>.48</del> <u>1.001</u>

a) What percent of students are in 10<sup>th</sup> grade and like English?

13.8%

b) What percent of students like math?

51.3%

c) What percent of students like Math and are in 12<sup>th</sup> grade?

.1 → 10%

d) What percent of those surveyed were seniors?

20%

Practice with Relative Frequencies

1) One hundred people who frequently get migraine headaches were chosen to participate in a study of new anti-headache medicine. Some of the participants were given the medicine; others were not. After one week, the participants were asked if they got a headache during the week. The two way frequency table summarizes the results. Create a table showing the joint relative frequencies and marginal relative frequencies. Round to the nearest hundredth for this problem.

		Frequencies		
		Took Medicine	Did NOT Take Medicine	
Headache	Headache	12	15	27
	No Headache	48	25	73
		60	40	100

  

		Relative Frequencies		
		Took Medicine	Did NOT Take Medicine	
Headache	Headache	.12	.15	.27
	No Headache	.48	.25	.73
		.6	.4	1

a. What is the relative frequency of participants that had a headache?

.27

b. What is the relative frequency of participants that did NOT take the medicine AND had a headache?

.15

2) Create a relative frequency table to represent the favorite movies of students.

		Favorite Movies of Students			
		Comedy	Drama	Horror	
Class	Class A	20	8	3	31
	Class B	18	6	9	33
		38	14	12	64

a. What percent of people prefer to watch comedies?

59%

b. What percent of people prefer to watch horror movies?

19%

		Favorite Movies of Students			
		Comedy	Drama	Horror	
Class	Class A	$\frac{20}{64} = .31$	.13	$\frac{3}{64} = .046875$	.49
	Class B	.28	.09	.14	.51
		.59	.22	.1875	1

c. What percent of people are from class A and prefer to watch drama movies?

13%

d. Which class prefers watching horror movies?

Class B