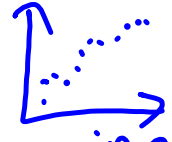


14-4: Two-Way Frequency Tables

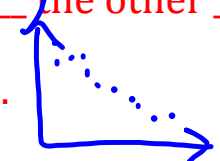
A **Two-way frequency** table displays 2 categories of data collected from the same source.

When we talk about two-way tables we often talk about two ideas being **correlated**.

Correlation is the relationship between 2 variables. If it seems like as one variable increases the other increases then the two variables are positive correlated.



If it seems like as one variable decreasing the other increasing then there is a negative correlation.



If there seems to be no relationship at all then they are not correlated.

The total of the rows and columns are called marginal frequencies.

Reading a two-way table:

		Student		Total
		Studied	Did Not Study	
Grade	Passed	21	2	23
	Failed	1	6	7
Total		22	8	30

Annotations from image:

- 22 students studied. (points to 22)
- 8 students did not study. (points to 8)
- 23 students passed. (points to 23)
- 7 students failed. (points to 7)
- 30 students were surveyed. (points to 30)

1. How many students studied and passed the test?

21

2. How many students studied and failed the test?

1

3. How many students did not study and passed the test?

2

4. How many students did not study and failed the test?

6

5. What percentage of students studied and passed the test?

$$\frac{\text{studied + passed}}{\text{total}} = \frac{21}{30} = 0.70 = \boxed{70\%}$$

6. What percentage of students did not study and failed the test?

didn't + fails → $\frac{6}{30} = .2 = 20\%$

total → 30

You randomly survey students in a cafeteria about their plans for a football game and a school dance. The two-way table shows your results.

- How many students will attend the dance but not the football game?
- Find and interpret the marginal frequencies for the survey.

		Football Game		
		Attend	Not Attend	
Dance	Attend	35	5	40
	Not Attend	16	20	36
		51	25	76

Handwritten annotations: A green '5' is written above the cell for 'Attend Dance' and 'Not Attend Football Game'. Blue arrows point from the marginal totals (51, 25, 76) to the right and down.

		Conditioner use		Total
		Use conditioner	Don't use conditioner	
Gender	Male	15	23	38
	Female	14	1	15
Total		29	24	53

1- What percent of the group is male?

$$\frac{38}{53} = .716 = 72\%$$

2- What percent of the group is male that used conditioner?

What percent of males use conditioner?

$$\frac{15}{38} = 39\%$$

3- What percent of the group uses conditioner?

male + female $\frac{29}{53} = 55\%$

4- What percent of the females use conditioner?

$$\frac{14}{15} = 93 = 93\%$$

5- Which group has a higher percentage using conditioner?

Males 39%

Females: 93%

6- Are there more males or more females that use conditioner?

Males

7- Do you think there is a correlation between conditioner use and being female?

Yes!

	uses cond.	doesn't use cond.	
male	8	7	15
female	10	0	10
	18	7	25

males: $\frac{8}{15} = 53\%$
 females: $\frac{10}{10} = 100\%$