

EQ: How can I use a frequency table to display and analyze data?

Frequency Distributions



Previously, we have analyzed **quantitative data**. Another type of data to analyze is **categorical or qualitative data**.

- One method of organizing categorical data is to use a **two-way frequency table**. This displays categorical data by representing the **number of occurrences** that fall into each group for two variables.

Example 1: Ms. Seymour is the school cafeteria supervisor at Williams High School. She has been asked to cut her food budget for the upcoming school year. One idea she has is to cut the number of meal choices during the week. However, determining which meal to cut will not be an easy decision. Ms. Seymour wonders if there is a difference in students' favorite cafeteria meals by grade level. She decides to survey the students in Mr. Kolbe's gym class, which consists of 9th and 10th graders. She recorded the results of her survey in the table shown.

a. Create a two way frequency table of the data.

		burgers	chicken nuggets	pizza	salad
Grade Level	9 th	4	1	3	5
	10 th	3	7	3	4

- The table is a type of **frequency distribution**. Each time you determine the frequency of one favorite meal of one of the grade levels, you recorded a **joint frequency**.

b. Create a table using the totals for each category.

		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

- This table is a type of **frequency marginal distribution**. This displays the total of the frequencies of the rows and columns of a frequency distribution.

total # of students.

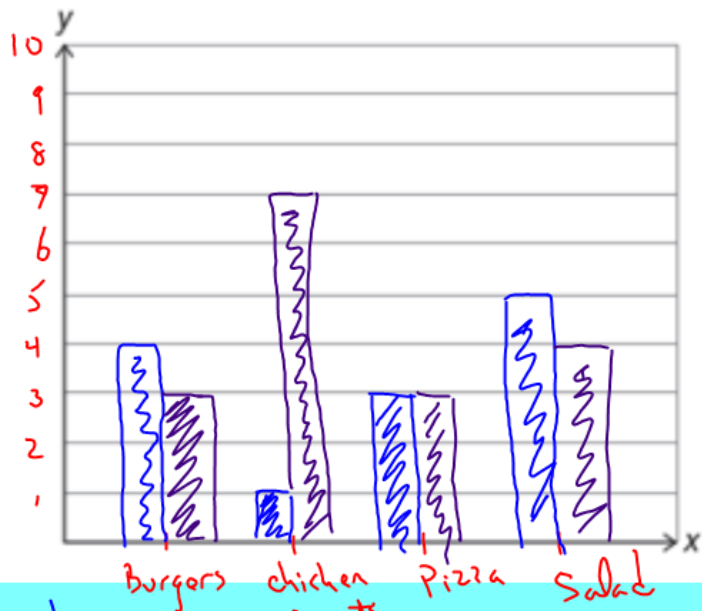
"totals"

c. This information can be represented visually. Because we have two categorical variables, we have to create a double bar graph for this data.

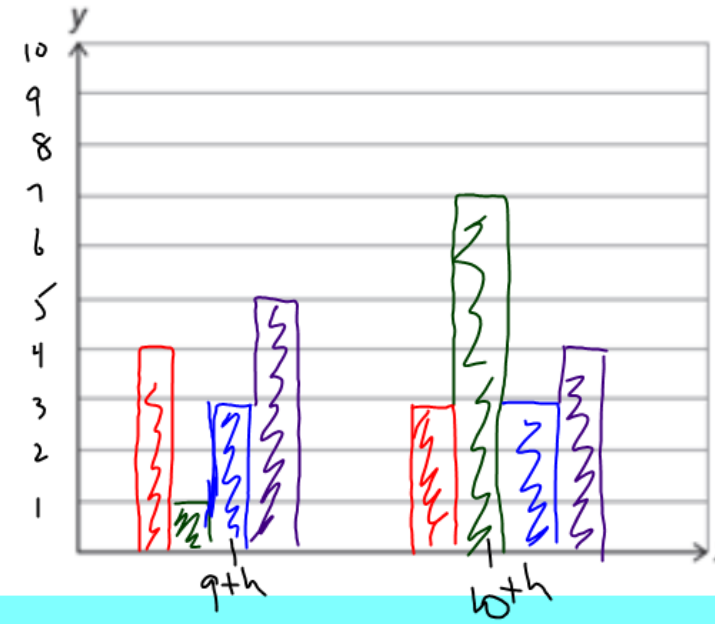
- We can create a bar graph using the favorite meals as the x axis and the number of students, frequency as the y axis.

- We can also let the x axis represent grade level.

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9th Graders
10th Graders



Burgers
chicken Nuggets
Pizza
Salad



When working with categorical data, it is often more efficient to **use percents** when analyzing data.

- The **relative frequency distribution** provide the ratio of occurrences in each category to the total number of occurrences.
- The **relative frequency marginal distribution** provides the ratio of total occurrences for each category to the total number of occurrences.

Example 2: The Northpointe community outreach director wants to plan special summer activities for the members of Northpointe. He posts a survey on the local newspaper's website to gather information on the favorite activities of the community members. Participants identified their age and then chose from four given activities. The responses gathered from the survey are shown.

- a. Complete the frequency marginal distribution for the data given.

Activities Preferred During Hot Weather

	Sports	Movies	Reading	Walking	Total
Students Age 18 Years Old and Under	20	30	22	8	80
Adults Age 19 Thru 50 Years Old	10	32	25	43	110
Adults Over 50 Years Old	5	20	35	30	90
Total	35	82	82	81	280

- b. From the frequency marginal distribution, construct a relative frequency distribution and relative frequency marginal distribution of the data.

20 out of 280

Activities Preferred During Hot Weather

	Sports	Movies	Reading	Walking	Total
Students Age 18 Years Old and Under	7.1%	10.7%	7.9%	2.9%	28.6%
Adults Age 19 Thru 50 Years Old	3.6%	11.4%	8.9%	15.4%	39.3%
Adults Over 50 Years Old	1.8%	7.1%	12.5%	10.7%	32.1%
Total	12.5%	29.2%	29.3%	29%	100%

$$\frac{20}{280} = 0.0714 \dots$$

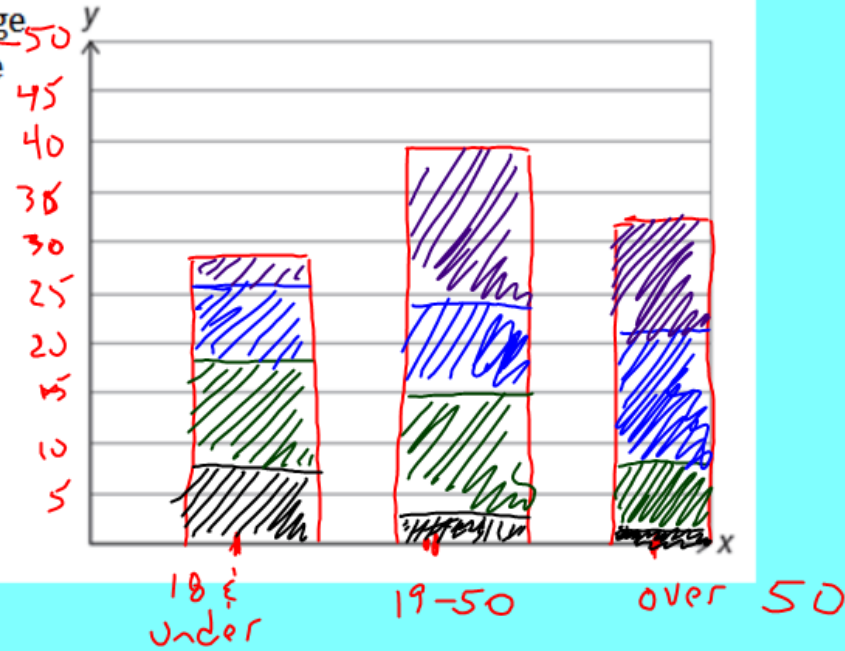
7.1%

c. We can visually represent this data using a bar graph that displays each relative frequency. We must use a stacked bar graph to represent this data.

- Construct a stacked bar graph using the age group as the x axis and the percents as the y axis.

$$\begin{array}{r}
 7.1\% \\
 + 10.7 \\
 \hline
 17.8\% \\
 + 7.9 \\
 \hline
 25.7
 \end{array}$$

Percent



sports
 movies
 reading
 walking

Age Group

Construct another using the activities as
the x axis.



You try:

Example 3 in your notes

Example 3: The teacher took a poll of the favorite color of all of the students in his class. The data is displayed in the table below.

a. Create a frequency marginal distribution for the data.

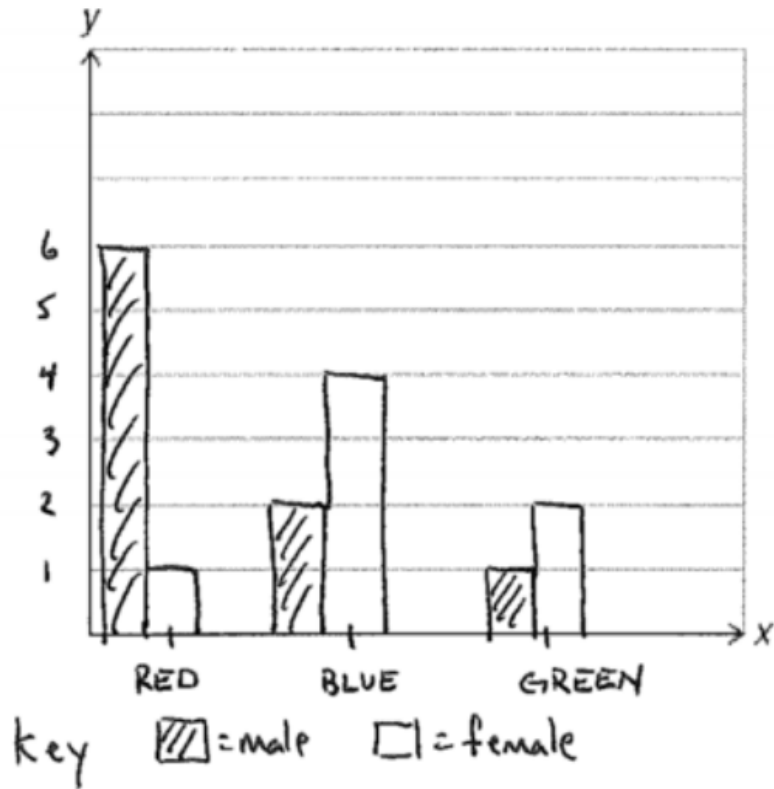
Student	Favorite Color
John	red
Sue	blue
Keesha	blue
Buddy	red
Michael	green
Carrie	blue
Jeff	red
Brady	red
Megan	green
Maura	green
Roman	red
Taylor	blue
Jessica	red
Bill	red
Bob	blue
Tim	blue

		Favorite Color of Students			
		RED	BLUE	GREEN	TOTAL
Gender	MALE	6	2	1	9
	FEMALE	1	4	2	7
	TOTAL	7	6	3	16

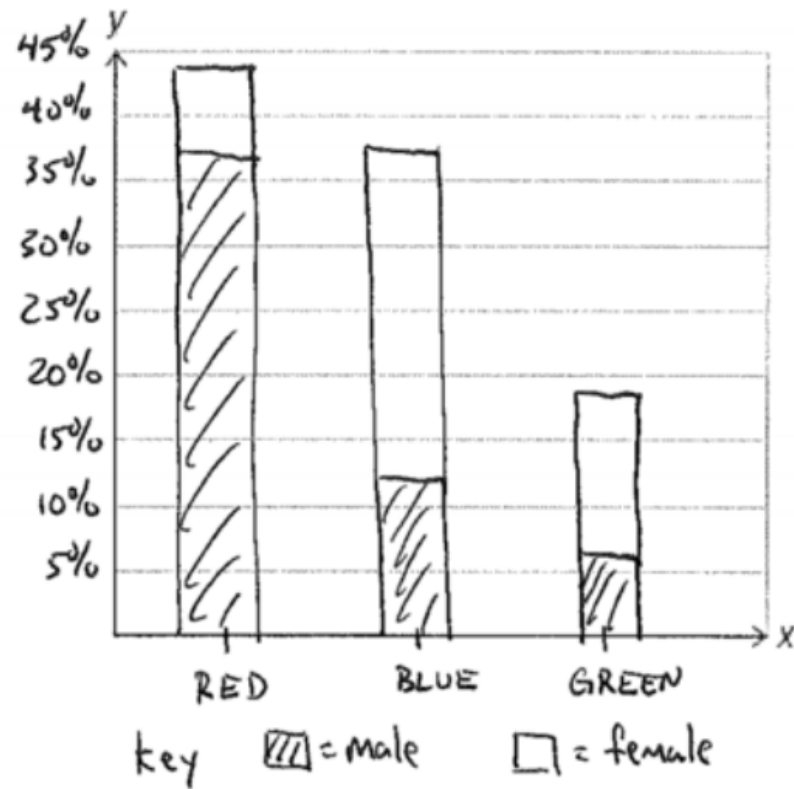
b. Create a relative frequency distribution.

		Favorite Color of Students			
		Red	Blue	Green	Total
Gender	Boys	37.5%	12.5 %	6.25%	56.25%
	Girls	6.25%	25%	12.5%	43.75%
	Total	43.75%	37.5 %	18.75%	100 %

c. Create a double bar graph to display the data from the marginal distribution.



d. Create a stacked bar graph for the distribution.



Homework #5: Frequency Distributions