Name_____ Date_____

10.4 Two-Way Tables
For use with Exploration 10.4

Essential Question   How can you read and make a two-way table?

1   EXPLORATION: Reading a Two-Way Table

Work with a partner. You are the manager of a sports shop. The two-way tables show the numbers of soccer T-shirts in stock at your shop at the beginning and end of the selling season. (a) Complete the totals for the rows and columns in each table. (b) How would you alter the number of T-shirts you order for next season? Explain your reasoning.

Beginning of season	T-Shirt Size					
	S	M	L	XL	XXL	Total
blue/white	5	6	7	6	5	
blue/gold	5	6	7	6	5	
red/white	5	6	7	6	5	
black/white	5	6	7	6	5	
black/gold	5	6	7	6	5	
Total						145

(Color labels the rows on the left side)

End of season	T-Shirt Size					
	S	M	L	XL	XXL	Total
blue/white	5	4	1	0	2	
blue/gold	3	6	5	2	0	
red/white	4	2	4	1	3	
black/white	3	4	1	2	1	
black/gold	5	2	3	0	2	
Total						

(Color labels the rows on the left side)

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2 **EXPLORATION:** Making a Two-Way Table

Work with a partner. The three-dimensional bar graph shows the numbers of hours students work at part-time jobs.

   a. Make a two-way table showing the data. Use estimation to find the entries in your table.

Part-Time Jobs of Students at a High School
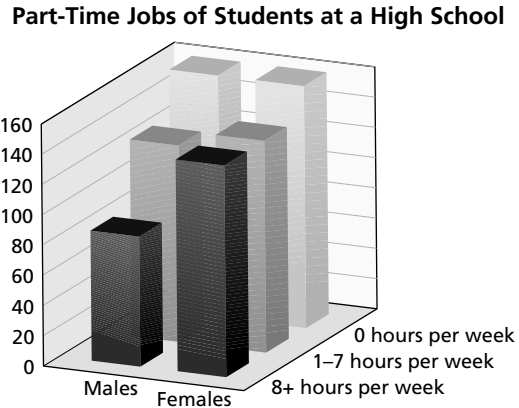
   b. Write two observations that summarize the data in your table.

Communicate Your Answer

   3. How can you read and make a two-way table?

10.4 Practice
For use after Lesson 10.4

Core Concepts

Relative Frequencies

A **joint relative frequency** is the ratio of a frequency that is not in the "total" row or the "total" column to the total number of values or observations.

A **marginal relative frequency** is the sum of the joint relative frequencies in a row or column.

When finding relative frequencies in a two-way table, you can use the corresponding decimals or percents.

Notes:

Conditional Relative Frequencies

A **conditional relative frequency** is the ratio of a joint relative frequency to the marginal relative frequency. You can find a conditional relative frequency using a row total or a column total of a two-way table.

Notes:

Worked-Out Examples

Example #1

You conduct a survey that asks 346 students whether they buy lunch at school. Use the results of the survey shown in the two-way table.

		Buy Lunch at School	
		Yes	No
Class	Freshmen	92	86
	Sophomore	116	52

a. How many freshmen were surveyed?

b. How many sophomores were surveyed?

c. How many students buy lunch at school?

d. How many students do not buy lunch at school?

		Buy Lunch at School		
		Yes	No	Total
Class	Freshmen	92	86	178
	Sophomore	116	52	168
	Total	208	138	346

a. A total of 178 freshmen were surveyed.

b. A total of 168 sophomores were surveyed.

c. A total of 208 students buy lunch at school.

d. A total of 138 students do not buy lunch at school.

Name _____ Date _____

Example #2

MAKING TWO-WAY TABLES A car dealership has 98 cars on its lot. Fifty-five of the cars are new. Of the new cars, 36 are domestic cars. There are 15 used foreign cars on the lot. Organize this information in a two-way table. Include the marginal frequencies.

		Condition		
		New	**Used**	**Total**
Origin	**Domestic**	36	28	64
	Foreign	19	15	34
	Total	55	43	98

Practice A

In Exercises 1 and 2, find and interpret the marginal frequencies.

1.

		Attend College	
		Yes	**No**
Gender	**Male**	98	132
	Female	120	88

2.

		Own a Car	
		Yes	**No**
Gender	**Male**	54	136
	Female	45	137

Name_____ Date_____

10.4 **Practice (continued)**

3. You conduct a survey that asks 85 students in your school whether they are in Math Club or Chess Club. Thirty-five of the students are in Math Club, and 20 of those students are also in Chess Club. Thirty-eight of the students are not in Math Club or Chess Club. Organize the results in a two-way table. Include the marginal frequencies.

4. Make a two-way table that shows the joint and marginal relative frequencies.

		Read *Catcher in the Rye*	
		Yes	No
Gender	Male	96	80
	Female	54	88

5. A company is organizing a baseball game for their employees. The employees are asked whether they prefer to attend a day game or a night game. They are also asked whether they prefer to sit in the upper deck or lower deck. The results are shown in a two-way table. Make a two-way table that shows the conditional relative frequencies based on the row totals. Given that an employee prefers to go to a day game, what is the conditional relative frequency that he or she prefers to sit in the lower deck?

		Seat	
		Upper	Lower
Game Time	Day	28	34
	Night	22	52

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Practice B

In Exercises 1 and 2, find and interpret the marginal frequencies.

1.

		Coffee	
		Yes	**No**
Tea	**Yes**	33	112
	No	24	20

2.

		Airplane	
		Yes	**No**
Train	**Yes**	5	3
	No	278	321

In Exercises 3 and 4, complete the two-way table.

3.

		Participated in a Triathlon		
		Yes	**No**	**Total**
Gender	**Female**	24		137
	Male		142	
	Total			306

4.

		Dual Enrollment Student		
		Yes	**No**	**Total**
Class	**Sophomore**		247	
	Senior	83		
	Total		432	550

5. You conduct a survey that asks 397 students in your school about whether they have played a musical instrument or participated in a sport. One hundred eighteen students have played a musical instrument and 57 of those students have participated in a sport. Thirty-four of the students have not played a musical instrument or participated in a sport. Organize the results in a two-way table. Include the marginal frequencies.