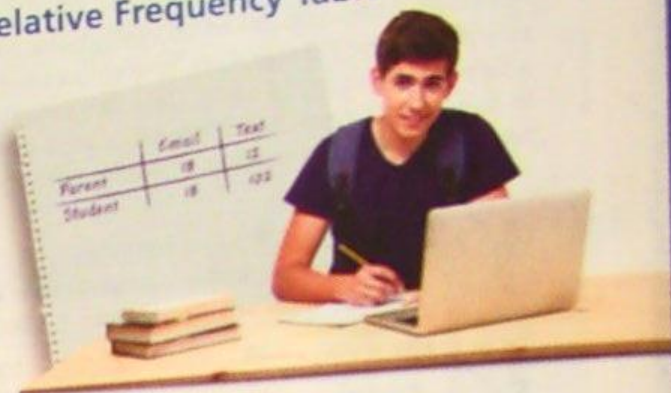


Essential Question What is the advantage of a two-way relative frequency table for showing relationships between sets of paired data?

EXAMPLE 1 Construct a Two-Way Relative Frequency Table

Scan for Multimedia

Caiden asked 150 parents and students about their preferred method of communication. What percent of people polled were students who preferred email?



Look for Relationships How is a two-way relative frequency table similar to a two-way frequency table? **MP.7**

Step 1 Make a two-way frequency table.

		Method of Communication		
		Email	Text	Total
People Polled	Parent	18	12	30
	Student	18	102	120
	Total	36	114	150

Step 2 Make a two-way relative frequency table.

A relative frequency table shows the ratio of the number of data in each category to the total number of data items. The ratio can be expressed as a fraction, decimal, or percent.

$\frac{18}{150} \cdot 100 = 12\%$

		Method of Communication		
		Email	Text	Total
People Polled	Parent	12%	8%	20%
	Student	12%	68%	80%
	Total	24%	76%	100%

Twelve percent of the people polled were students who preferred email.

Try It!

Asha asked 82 classmates whether they play sports on the weekend. The results are shown in the two-way frequency table below.

Two-Way Frequency Table

		Play Sports on the Weekend		
		Yes	No	Total
People Polled	Boys	21	18	39
	Girls	26	17	43
	Total	47	35	82

Use Asha's two-way frequency table to complete the two-way relative frequency table.

$\frac{21}{82} \cdot 100$

Two-Way Relative Frequency Table

		Play Sports on the Weekend		
		Yes	No	Total
People Polled	Boys	25.6%	22.0%	47.6%
	Girls	31.7%	20.7%	52.4%
	Total	57.3%	42.7%	100%

Convince Me! How is a two-way relative frequency table different from a two-way frequency table?

Use the given data to make a two-way relative frequency table by rows.

According to the row relative frequency table, what percent of students polled attended the last home game compared to the percent of faculty polled who attended the last home game?

		Last Home Game Attendance		
		Yes	No	Total
People Polled	Student	$\frac{42}{68} \cdot 100 \approx 61.8\%$	38.2%	100%
	Faculty	$\frac{15}{27} \cdot 100 \approx 55.6\%$	44.4%	100%
	Total	60%	40%	100%

61.8% of students polled attended the last home game, which is more than the 55.6% of faculty polled who attended the last home game.

		Home Game Attendance		
		Yes	No	Total
People Polled	Student			
	Faculty			
	Total			

The data you need to compare are in two different rows. Divide each frequency by the row total, not the table total.

EXAMPLE 3



Compare Relative Frequency by Columns

Use the given data to make a two-way relative frequency table by columns.

According to the column relative frequency table, do 8th graders check out a greater percentage of e-books than 7th graders? Explain.

		Grade		
		7th	8th	Total
Book Type	E-books	$\frac{85}{207} \cdot 100 \approx 41.1\%$	$\frac{125}{197} \cdot 100 \approx 63.5\%$	52%
	Audio	58.9%	36.5%	48%
	Total	100%	100%	100%

The data you need to compare are in two different columns. Divide each frequency by the column total, not the table total.

		Grade		
		7th	8th	Total
Book Type	E-books	85	125	210
	Audio	122	72	194
	Total	207	197	404

Yes; of the 8th graders, 63.5% have checked out an e-book, compared to 41.1% of the 7th graders.

Try It!

Use the data in the table above.

- How does the percent of students who choose e-books compare to the percent of students who choose audiobooks? *E-books were favored over audio 48%*
- Is there evidence that 7th graders have a greater tendency to choose audiobooks? Explain. *Yes, 58.9% > 36.5% (7th) (8th)*

KEY CONCEPT



Relative frequency is the ratio of a data value to the total of a row, a column, or the entire data set. It is expressed as a percent. A total two-way relative frequency table gives the percent of the population that is in each group.

In a row two-way relative frequency table, the percents in each row add up to 100%.

In a column two-way relative frequency table, the percents in each column add up to 100%.

Total Two-Way Relative Frequency Table

		Garage Parking		
		Yes	No	Total
Type of Dwelling	House	42%	33%	75%
	Condo	18%	7%	25%
	Total	60%	40%	100%

Do You Understand?

- Essential Question** What is the advantage of a two-way relative frequency table for showing relationships between sets of paired data?

Comparing values in a relative frequency table is better especially if the subcategories aren't equally represented.

- Reasoning** When comparing relative frequency by rows or columns only, why do the percentages not total 100%? Explain. **MP.2**

B/c they aren't relative to the total.

- Critique Reasoning** Maryann says that if 100 people are surveyed, the frequency table will provide the same information as a total relative frequency table. Do you agree? Explain why or why not. **MP.3**

Yes, bc percents are out of 100.

Do You Know How?

In 4–6, use the table. Round to the nearest percent.

		Artistic Ability		
		Yes	No	Total
Dominant Hand	Left	86	45	131
	Right	15	77	92
	Total	101	122	223

- What percent of the people surveyed have artistic ability?
- What percent of left-handed people surveyed have artistic ability?
- What percent of the people who have artistic ability are left-handed?

