



### Interpreting Relative Frequencies (page 1)

**Relative frequency** is the ratio of the value of a subtotal to the value of the total, expressed as a decimal or percent. A two-way table can show relative frequencies for rows or for columns, rather than the actual values. You can determine possible associations between variables by analyzing the relative frequencies.


**Example:** Consider a class of 50 students. There are 20 boys and 30 girls. 5 boys wear glasses and 18 girls wear glasses. Use a two-way table to display the frequencies.

	Glasses	No Glasses	Total
Boys	5	15	20
Girls	18	12	30
Total	23	27	50

	Glasses	No Glasses	Total
Boys	$\frac{5}{50} = .1 \text{ or } 10\%$	$\frac{15}{50} = .3 \text{ or } 30\%$	$\frac{20}{50} = .4 \text{ or } 40\%$
Girls	$\frac{18}{50} = .36 \text{ or } 36\%$	$\frac{12}{50} = .24 \text{ or } 24\%$	$\frac{30}{50} = .6 \text{ or } 60\%$
Total	$\frac{23}{50} = .46 \text{ or } 46\%$	$\frac{27}{50} = .54 \text{ or } 54\%$	$\frac{50}{50} = 1 \text{ or } 100\%$


To find the relative frequency for the overall total, find the ratio for each cell by dividing the value by 50.

To find the relative frequencies by *row* (distribution of the wearing of glasses), write the ratios of each value to the *total for the row*.



	Glasses	No Glasses	Total
Boys	$\frac{5}{20} = .25 \text{ or } 25\%$	$\frac{15}{20} = .75 \text{ or } 75\%$	$\frac{20}{20} = 1 \text{ or } 100\%$
Girls	$\frac{18}{30} = .6 \text{ or } 60\%$	$\frac{12}{30} = .4 \text{ or } 40\%$	$\frac{30}{30} = 1 \text{ or } 100\%$

- a) If you are looking at a boy, there is a better chance that he \_\_\_\_\_ wearing glasses.
- b) More girls \_\_\_\_\_ glasses.



	Glasses	No Glasses
Boys	$\frac{5}{23} \approx .22 \text{ or } 22\%$	$\frac{15}{27} = .56 \text{ or } 56\%$
Girls	$\frac{18}{23} = .78 \text{ or } 78\%$	$\frac{12}{27} = .44 \text{ or } 44\%$
Total	$\frac{23}{23} = 1 \text{ or } 100\%$	$\frac{27}{27} = 1 \text{ or } 100\%$

To find the relative frequencies by *column* (distribution of the genders), write the ratios of each value to the total (in that column). Round decimals to the nearest hundredth.

- c) More \_\_\_\_\_ than \_\_\_\_\_ wear glasses.
- d) Looking at those that do not wear glasses, the distribution is somewhat \_\_\_\_\_ with slightly more \_\_\_\_\_ not wearing glasses.

## Interpreting Relative Frequencies (page 2)

1. The United States Senate has 100 members. 44 are Democrats. On a recent bill, there were 53 YEAs; of these YEAs, 32 votes were Republicans. Complete the two-way table.

	Yes ("YEA")	No ("NAY")	Total
Democrats			
Republicans			
Total			

Using the data in the above two-way table, determine if the following statements are true or false:

- Both Democrats and Republicans tended to favor the bill.
- More Republicans than Democrats voted NAY, so Republicans were more likely to oppose the bill that Democrats were.
- Republicans tended to vote YEA on the bill, while Democrats were more likely to vote NAY than YEA

2. A survey was taken of 8<sup>th</sup> graders regarding their participation in school clubs. The results are shown in the chart below. Use the results to complete the two-way table.

Student	Gender		Participate?	
	Male	Female	Yes	No
A	✓		✓	
B	✓		✓	
C	✓			✓
D		✓	✓	
E	✓		✓	
F		✓		✓
G		✓	✓	
H		✓	✓	
I	✓		✓	
J	✓			✓
K		✓	✓	
L		✓	✓	
M	✓		✓	
N		✓		✓
O	✓			✓

Participate in a Club?	Gender	
	Male	Female
Yes		
No		

- a) Complete the two-way relative frequency table to show the correct percentages in all cells.

	Male	Female	Total
Total			

- b) Find the relative frequencies of students in the survey by column. Express your values as %.

	Male	Female
Total		

- c) State whether the results of the survey provide evidence that if you are an 8<sup>th</sup> grade male you would more likely be a member of a club than not. Explain your answer.