# LESSON

# Two-Way Relative Frequency Tables *Practice and Problem Solving: A/B*

#### Rewrite each frequency in the table as a relative frequency. Write each one as a percent to the nearest whole percent. Show your work. Home Heating Energy Sources Sample

	Electric	Gas	TOTAL
Inside City	35	55	90
Limits	1.	2.	3.
Outside City Limits	 60 4	 15 5	75 6
TOTAL	95	70	165
	7	8	9

#### Complete.

10. Name the four joint relative frequencies (JRFs) shown in the table by using the names of the columns *and* rows. Give the percent for each. Show your work.

	JRF name:,	percent:
	JRF name:,	percent:
	JRF name:,	percent:
	JRF name:,	percent:
11.	Name the four marginal relative frequence using the name of the column <i>or</i> row. Giv your work.	ies (MRFs) in the table by e the percent for each. Show
	MRF name:	percent:
Cal	culate the conditional relative frequency	у.
12.	Electric, Inside City Limits:	13. Gas, Outside City Limits:
	÷=	÷≈

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8. There seems to be a relationship between eating fruit and not gaining weight because, compared to the percent of all people surveyed who gained weight, the percent of people who ate fruit and gained weight was about half as great.

### Reteach

- 1. 18 commuters out of 23, or about 78%, of commuters who got less than 20 miles per gallon, drove 3 miles, which suggests an association between short commuting distance and poor gas mileage.
- 5 commuters out of 23, or about 22%, of commuters who got less than 20 miles per gallon, drove 30 miles, which suggests an association between longer commuting distances and better gas mileage.
- Answers might vary, but students should suggest that the 30-mile commute might take more time and use more fuel than the 3-mile commute. Also, mileage will depend on the age and engine efficiency of the car used.

# **Reading Strategies**

- 1. the number of athletes who trained for 3 months, and the portions of that number whose maximum bench press was either less than 150 lb or 150 lb or greater
- 2. the number of athletes who trained for 6 months, and the portions of that number whose maximum bench press was either less than 150 lb or 150 lb or greater
- 3. the total number of athletes, and the portions of that number whose maximum bench press is either less than 150 lb or is 150 lbs or greater
- 4. the total number of athletes whose maximum bench press was less than 150 lb, and the portions of that number who trained for either 3 months or 6 months

5. Answers may vary, but students should observe that there is a mild association between the number of athletes who trained for 6 months and those whose maximum bench press is 150 lb or greater. That is, slightly more athletes can lift 150 lb or more after 3 extra months of training.

# **Success for English Learners**

- 1. 24 out of 81, or about 30%
- 2. 10 out of 81, or about 12%
- 3. Students who have a job are more likely to have a bike.
- 4. Students who do not have a job are less likely to have a bike.

# LESSON 15-2

# Practice and Problem Solving: A/B

Note: Due to rounding, percentages may not add up to the percentages shown in the "Total" columns in the table.

1. 
$$\frac{35}{165}$$
 ≈ 21%

2. 
$$\frac{55}{165} \approx 33\%$$

3. 
$$\frac{90}{165} \approx 55\%$$

4. 
$$\frac{60}{165} \approx 36\%$$

5. 
$$\frac{15}{165} \approx 9\%$$

6. 
$$\frac{75}{165} \approx 45\%$$

7. 
$$\frac{95}{165} \approx 58\%$$

8. 
$$\frac{70}{165} \approx 42\%$$

9. 
$$\frac{165}{165} = 100\%$$

10. Students may list the four JRFs in any order.			
Electric, Inside City Limits; $\frac{35}{165} \approx 21\%$			
Electric, Outside City Limits; $\frac{60}{165} \approx$			
36%			
Gas, Inside City Limits; $\frac{55}{165} \approx 33\%$			
Gas, Outside City Limits; $\frac{15}{165} \approx 9\%$			
11. Students may list the four MRFs in any order.			
Electric; $\frac{95}{165} \approx 58\%$			
Gas;			
Inside City Limits; $\frac{90}{165} \approx 55\%$			
Outside City Limits; $\frac{75}{165} \approx 45\%$			
12. 21: 58: about 36%			
13. 9; 42; about 21%			
Practice and Problem Solving: C			

#### Practice and Problem Solving: C

1. The JRF for electric use inside the city limits is  $\frac{35}{165}$ , whereas the CRF for

electric use inside the city limits is  $\frac{35}{95}$ 

The CRF should be greater than the JRF.

- 2. about 21%; about 37%
- 3. Yes, the CRF is greater because the frequency of electric use inside the city limits is divided by a smaller number, the combined use of electric energy inside and outside the city limits.
- 4. The marginal relative frequency (MRF)

for electric use  $(\frac{95}{165}, \text{ or about 58\%})$  is greater than the MRF for gas  $(\frac{70}{165}, \text{ or })$ about 42%) both inside and outside the city limits. The joint relative frequency (JRF) for electric use is greater outside

the city limits  $(\frac{60}{165})$ , or about 36%) than

inside the city limits  $(\frac{35}{165})$ , or about

21%), whereas the JRF for gas use is greater inside the city limits than outside. The conditional relative frequencies (CRF) for electric and gas usage further supports the JRF associations, namely, that electric use is greater outside the city limits, and gas use is greater inside the city limits.

#### Practice and Problem Solving: D

1. 21; 77; 0.27; 27 2. 17; 77; 0.22; 22 3. 21; 17; 77; 38; 77; 0.49; 49 4. 16; 23; 77; 39; 77; 0.51; 51 5. 21; 38; 0.55; 55 6. 17; 38; 0.45; 45

#### Reteach

- 1. Brand A more than or less than 24 ounces:  $\frac{10 + 12}{62} \approx 35\%$ ; Brand B more than *or* less than 24 ounces:  $\frac{9+15}{79} \approx$ 30%; Brand C more than or less than 24 ounces:  $\frac{7+6}{38} \approx 34\%$ ; So, Brand A has the greatest percentage of samples that deviate from exactly 24 ounces.
- 2. Brand A less than 24 ounces:  $\frac{12}{62} \approx$

19%; Brand B less than 24 ounces:

 $\frac{9}{79} \approx 11\%$ ; Brand C less than 24

ounces:  $\frac{7}{38} \approx 18\%$ ; Brand A has the

greatest percentage of samples that contain less than 24 ounces.

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