Name: Key Block:_____ Date:_____

Two-Way Data Tables

Relationships in Categorical Data

Print or Digital News

To plan their marketing for an upcoming year, a media organization asked consumers, "Do you prefer print newspapers or digital news?" The table shows the preferences by age group.

	Prefer print newspaper	Prefer digital news	Total
Age $\leq$ 40	45	60	105
Age > 40	15	20	35
	60	80	

- Does it look like younger and older readers have the same preferences in news type?

Just looking at the numbers, it looks like younger people prefer print news 3 times as much as older people.

B. Use the survey data. Is each statement true or false? Explain.

1. Younger readers are three times as likely as older readers to prefer print newspapers.

Younger Total → $\frac{45}{105} = \frac{3}{7}$ Older Total → $\frac{15}{35} = \frac{3}{7}$ False. They are equally as likely.

2. Younger readers are three times as likely as older readers to prefer digital news.

Younger Total → $\frac{60}{105} = \frac{4}{7}$ Older Total → $\frac{20}{35} = \frac{4}{7}$ False. They are equally as likely.

3. The number of readers who prefer print newspapers is about three quarters of the number who prefer digital news.

Prefer Print → 60, Prefer Digital → 80, $\frac{60}{80} = \frac{3}{4}$ True

4. Younger readers are more likely than older readers to prefer digital news.

Younger Total → $\frac{60}{105} = \frac{4}{7}$ Older Total → $\frac{20}{35} = \frac{4}{7}$ False. They are equally as likely.

5. Older readers are more likely than younger readers to prefer print newspapers.

Older Total → $\frac{15}{35} = \frac{3}{7}$ Younger Total → $\frac{45}{105} = \frac{3}{7}$ False. They are equally as likely.

C. Suppose that the media organization had each news type available. One day there were 210 readers over the age of 40 and 525 readers under the age of 40.

Use the survey data from Question A to help you answer the following questions.

1. How many readers would you expect to read the print newspaper and how many would you expect to read the digital news? Show your thinking.

Print:

Total Print → $\frac{60}{140} = \frac{x}{735}$

Total People →

$x = 315$

315 Print Readers

Digital:

Total Digital → $\frac{80}{140} = \frac{x}{735}$

Total People →

420 Digital Readers

2. How would you expect those readers to be distributed by age and media type in the following table?

	Prefer print newspaper	Prefer digital news	Total
Age ≤ 40	45(7) = 225	60(5) = 300	525
Age > 40	15(6) = 90	20(6) = 120	210
Total	315	420	735

C. Based on the data, which type of news would you recommend the company put more money towards? Explain your choice.

Digital - explain

Favorite Cafeteria Food

A. Complete the two-way table below representing the favorite cafeteria foods for students and teachers at Sandy Brook Middle School.

Favorite Cafeteria Food

	Pizza	Taco	Burger	Total
Teachers	12	32	21	65
Students	120	66	34	220
Total	132	98	55	285

B. For each question, use numbers/calculations to support your answer.

1. How many people were surveyed?

   285

2. What is the overall favorite food?

   Pizza

3. How likely is it that a teacher chooses Tacos as their favorite?

   $\frac{32}{65} = 49.2\%$

4. What is more likely, a teacher will choose pizza as their favorite, or that someone who chooses pizza as their favorite is a teacher?

   Teacher chooses pizza: $\frac{12}{65} = 18.5\%$

   Pizza lover is a teacher: $\frac{12}{132} = 9.1\%$

5. True or False. Students are approximately equally as likely to choose Tacos as teachers are to choose burgers.

   Students and Tacos $\frac{66}{220} = 30\%$

   Teachers and Burgers $\frac{21}{65} = 32.2\%$

   True

   $30 \approx 32.2$

6. True or False. Teachers are approximately two times more likely than students to choose burgers as their favorite.

   Teachers and Burgers $\frac{21}{65} = 32.2\%$

   Students and Tacos $\frac{34}{220} = 15.5\%$

   True: $\frac{32.2}{15.5} = 2.1$

C. Convert the 2-Way Table from above into a relative frequency table. All entries should be percents written as a decimal. Round all numbers to the thousandths place.

Favorite Cafeteria Food

	Pizza	Taco	Burger	Total
Teachers	.042	.112	.074	.228
Students	.421	.232	.119	.772
Total	.463	.344	.193	1.00

1. What percent prefer Tacos?

34.4%

2. What percent of those eating cafeteria food are students?

77.2%

D. Suppose the high school has 400 people (students and teachers) buying lunch in the cafeteria. Use the survey data from the Middle School to answer the following questions. (Show all work.)

1. What is the total number of students at the high school who buy lunch?

400 (0.772) = 308.8 ~ 309 students

2. How many people have burgers as their favorite?

400 (0.193) = 77.4 ~ 77 people

3. Pizza is the favorite of how many students?

400 (0.421) = 168.4 ~ 168 students