

# Unit 8 Lesson 9: Using Tables for Conditional Probability

## 1 Math Talk: Fractions in Fractions (Warm up)

### Student Task Statement

Evaluate each expression mentally.

$$\frac{7}{11} \div \frac{8}{11}$$

$$\frac{\left(\frac{1}{3}\right)}{\left(\frac{2}{3}\right)}$$

$$\frac{\left(\frac{1}{4}\right)}{\left(\frac{1}{2}\right)}$$

$$\frac{\left(\frac{3}{8}\right)\left(\frac{8}{19}\right)}{\left(\frac{5}{19}\right)}$$

## 2 A Possible Cure

### Student Task Statement

A pharmaceutical company is testing a new medicine for a disease using 115 test subjects. Some of the test subjects are given the new medicine and others are given a placebo. The results of their tests are summarized in the table.

	no more symptoms	symptoms persist	total
given medicine	31	26	57
given placebo	16	42	58
total	47	68	115

1. Divide the value in each cell by the total number of test subjects to find each probability to two decimal places. Some of the values have been completed for you.

	no more symptoms	symptoms persist	total
given medicine	0.27		0.50
given placebo			
total			1

If one of these test subjects is selected at random, find each probability:

- a.  $P(\text{symptoms persist})$
- b.  $P(\text{given medicine and symptoms persist})$
- c.  $P(\text{given placebo or symptoms persist})$

2. From the original table, divide each cell by the total for the row to find the probabilities with row conditions. Some of the values have been completed for you.

	no more symptoms	symptoms persist	total
given medicine	0.54		
given placebo			1

a.  $P(\text{symptoms persist} \mid \text{given medicine})$

b.  $P(\text{no more symptoms} \mid \text{given placebo})$

3. Jada didn't read the instructions for the previous problem well and used the table she created on the first problem to divide each cell by the probability total for each row. For example, in the top left cell she calculated  $0.27 \div 0.5$ . Complete the table using Jada's method.

	no more symptoms	symptoms persist	total
given medicine			
given placebo			

What do you notice about this table?

4. From the original table, divide each cell by the total for the column to find the probabilities with column conditions. Some of the values have been completed for you.

	no more symptoms	symptoms persist
given medicine	0.66	
given placebo		
total		1

a.  $P(\text{given medicine} \mid \text{symptoms persist})$

b.  $P(\text{given placebo} \mid \text{no more symptoms})$

5. Are the events "symptoms persist" and "given medicine" independent events? Explain or show your reasoning.
6. Based on your work, does being given this medicine have an impact on whether symptoms persist or not?

### 3 The Blood Bank

#### Student Task Statement

A blood bank in a region has some information about the blood types of people in its community. Blood types are grouped into type O, A, B, and AB. Each blood type either has the Rh factor (Rh+) or not (Rh-). If a person is randomly selected from the community, the probability of their having each blood type and Rh factor combination is shown in the table.

	O	A	B	AB
Rh+	0.374	0.357	0.085	0.034
Rh-	0.066	0.063	0.015	0.006

1. What does the 0.085 in the table represent?
2. Use the table or create additional tables to find the probabilities, then describe the meaning of the event.
  - a.  $P(O)$
  - b.  $P(\text{Rh}+)$
  - c.  $P(O \text{ and } \text{Rh}+)$
  - d.  $P(O \text{ or } \text{Rh}+)$
  - e.  $P(O \mid \text{Rh}+)$
  - f.  $P(\text{Rh}+ \mid O)$