3.4 Contingency Tables

A contingency table is a cross tabulation of data in which the data of one variable is distributed in columns and the data of a 2nd variable is distributed in rows. The table is used to study the relationship between the two variables.

Here is an example of a contingency table:

Medicine Taken

Cold Length	(*A*) Yes	(*B*) No	Total
(*C*) 1 – 3 days	86	19	**105**
(*D*) 4 – 7 days	16	79	**95**
Total	**102**	**98**	**200**

Demonstration Problems	*Practice Problems*
For the contingency table above, find the following probabilities for a randomly selected subject in this study. **1. (a)** $P(A) =$	For the contingency table above, find the following probabilities for a randomly selected subject in this study. **1. (b)** $P(B) =$
2. (a) $P(A \mid D) =$	**2. (b)** $P(B \mid C) =$
3. (a) $P(D \mid A) =$	**3. (b)** $P(C \mid B) =$
4. (a) $P(A \text{ and } D) =$	**4. (b)** $P(B \text{ and } D) =$
5. (a) $P(A \text{ or } D) =$	**5. (b)** $P(B \text{ or } D) =$
Answers: **1. (b)** $P(B) = 0.49$; **2. (b)** $P(B \mid C) \approx 0.18$; **3. (b)** $P(C \mid B) \approx 0.19$; **4. (b)** $P(B \text{ and } D) = 0.395$; **5. (b)** $P(B \text{ or } D) = 0.57$	

Let's make our own contingency table comparing the number of hours of sleep a student in this class gets with whether the student works and takes classes, or takes classes only.

Hours of sleep students in this class got last night

Student		*A*	*B*	*C*	*D*	*E*	*F*	
		0 – 2 hrs	2 – 4 hrs	4 – 6 hrs	6 – 8 hrs	8 – 10 hrs	10+ hrs	Total
G	Works and takes classes							
H	Takes classes only							
Total								

Demonstration Problems	*Practice Problems*
For our contingency table, find the following probabilities for a randomly selected student in this class. **6. (a)** $P(E)$ =	For our contingency table, find the following probabilities for a randomly selected student in this class. **6. (b)** $P(B \text{ or } C)$ =
7. (a) $P(E \mid G)$ =	**7. (b)** $P(C \mid G)$ =
8. (a) $P(E \mid H)$ =	**8. (b)** $P(E \mid G)$ =
9. (a) $P(C \text{ and } G)$ =	**9. (b)** $P(E \text{ and } H)$ =
10. (a) $P(C \text{ or } G)$ =	**10. (b)** $P(E \text{ or } H)$ =