

5. Use the table to decide whether or not these variables are independent. Explain.

$P(B|M) = 0.4463$  and  $P(B) = \frac{115}{271} = 0.4244$ . Buying online and gender may be independent. The probability that males buy online is nearly the same as the overall probability of buying online.

6. You repeat this survey in another class of 24 students and find six of the nine females intend to buy online and 11 males do not intend to buy. Organize these responses in the table and show whether sex and buying intentions are independent in this class.

Sex	Intend to Buy		
		Yes	No
	Total	10	14
Male	4	11	15
Female	6	3	9
Total	10	14	24

$P(B|M) = \frac{4}{15} = 0.2667$  and  $P(B) = \frac{10}{24} = 0.4167$ . According to this sample, buying online and sex are not independent. Males are less likely to buy online than people overall.

158 **Part IV Randomness and Probability**

$$b) P(\text{Dem.} \mid \text{favor death pen.}) = \frac{P(\text{Dem.} \cap \text{favor death pen.})}{P(\text{favor death penalty})} = \frac{0.12}{0.62} \approx 0.194$$

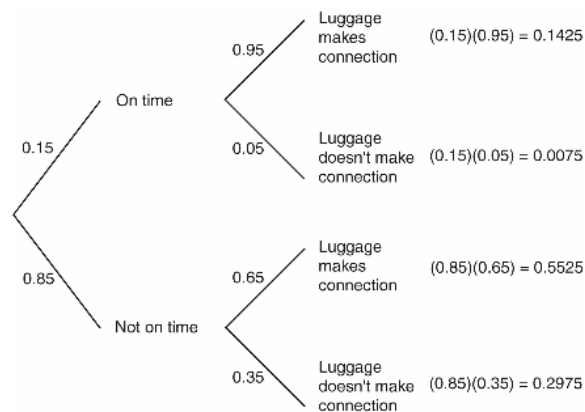
Consider only the Favor column. The probability of being a Democrat is 0.12 out of a total of 0.62 for that column.

**26. Luggage.**

No, the flight leaving on time and the luggage making the connection are not independent events. The probability that the luggage makes the connection is dependent on whether or not the flight is on time. The probability is 0.95 if the flight is on time, and only 0.65 if it is not on time.

**27. Graduation.**

Yes, there is evidence to suggest that a freshman's chances to graduate depend upon what kind of high school the student attended. The graduation rate for public school students is 75%, while the graduation rate for others is 90%. If the high school attended was independent of college graduation, these percentages would be the same.

**28. More luggage.**

$$P(\text{Luggage}) = P(\text{On time} \cap \text{Luggage}) + P(\text{Not on time} \cap \text{Luggage})$$

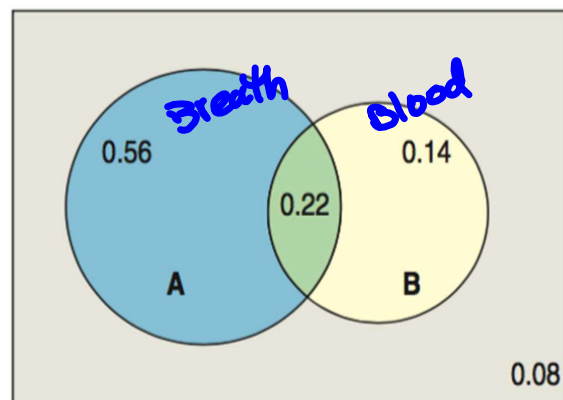
$$= (0.15)(0.95) + (0.85)(0.65) = 0.695$$

## Tables vs. Venn Diagrams

- Contingency tables are one of the easiest ways to think about conditional probabilities.
- But note that we can turn a 2 x 2 table into a Venn diagram.
- Two different and useful ways of looking at data!

## Tables vs. Venn Diagrams (cont.)

		Breath Test		Total
		Yes	No	
Blood Test	Yes	0.22	0.14	<b>0.36</b>
	No	0.56	0.08	<b>0.64</b>
	Total	<b>0.78</b>	<b>0.22</b>	<b>1.00</b>



In our classroom today:

	Sneakers	No Sneakers	Total
Males	8	1	9
Females	8	2	10
Total	16	3	19

1. What is the prob. that a <sup>Given</sup> male is wearing sneakers?

$$P(\text{sneakers}|\text{M}) = \frac{8}{9} = .89$$

2. What is the prob. that someone wearing sneakers <sup>Given</sup> is a male?

$$P(\text{M}|\text{sneakers}) = \frac{8}{16} = .50$$

3. Are being male and wearing sneakers independent?

$$P(\text{Sneakers}) = \frac{16}{19} = .84$$

$$P(\text{Sneakers}|\text{M}) = .89$$

$\therefore$  May be indep b/c Prob. are close  
(But completely equal)

4. Are being male and wearing sneakers disjoint?

Can be both.  
 $\therefore$  Not disjoint

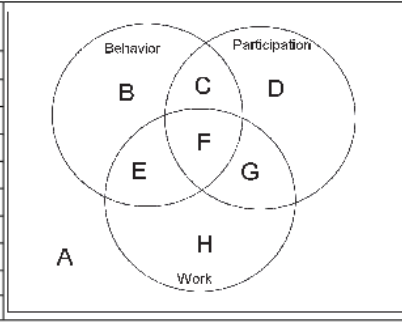
Name \_\_\_\_\_

## Statistics: Chapter 14 Venn Diagrams

1. This chart shows a teacher's grade book and a Venn diagram. An X in the grade book means that a student is doing well in that category.

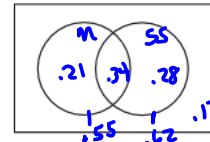
	Behavior	Work	Participation	(for part a)
Max Barbe	X		X	C, F
Jerri Kruchten		X		H
Neil Musto	X	X		E, F
Katy Oman	X			B
Jamie Huberty		X	X	F, G
Katy Kanter	X		X	C, F
Max Stults		X	X	F, G, H
Nelson Doshier			X	D
Darren Veatch				A
Julio Heeter	X	X	X	F

\*names generated by <http://www.kleimo.com/random/name.cfm>

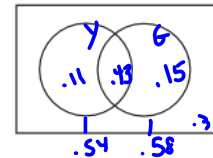


- a. In the last column of the chart, write the letter of the region(s) of the Venn diagram that corresponds with each student.
- b. Give the letter of the region(s) of the Venn diagram that represents the following
- Students who have good behavior and work E, F
  - Students who have good behavior or work B, C, E, F, G, H
  - Students who have good participation and behavior or who complete their work. C, F, E, G, H
2. Find the probability for each problem. Start by drawing a Venn diagram.

- a. A store receives a shipment of new shirts. 55% are men's shirts, 62% are short-sleeved, and 34% are both. Find the probability that a randomly selected shirt is...
- is a men's short-sleeved shirt. .34
  - is a men's shirt or a short-sleeved shirt. .83
  - is not a men's shirt. .45
  - Is a men's shirt that is not short-sleeved. .21



- b. The senior class is collecting orders for graduation. So far, 54% have ordered their yearbook, 58% have ordered their gown and 15% have ordered their gown but not their yearbook. Find that probability that a randomly selected senior...
- has ordered both a gown and a yearbook. .43
  - has ordered a yearbook or a gown. .69
  - has ordered neither a yearbook nor a gown. .31
  - has ordered a yearbook but not a gown. .11



# Homework: Book Questions # 6 - 15 (Page 343)