Questions on 9.3 Set (pgs.15-16) or 9.4 Set (pgs.19-21)?

Mar 28-10:02 AM

SM2 - Module 9 SE.pdf - Adobe Acrobat Reader DC

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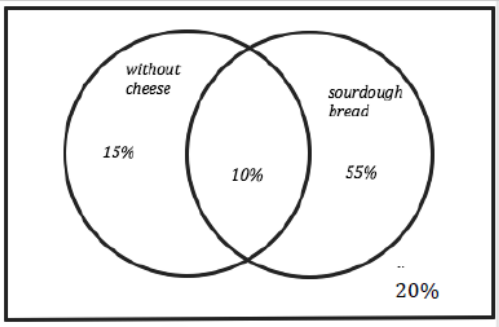
The Venn diagram to the right shows the data collected at a sandwich shop for the last six months with respect to the type of bread people ordered (sourdough or wheat) and whether or not they got cheese on their sandwich. Use this data to create a two-way frequency table and answer the questions.



8. Two-way frequency table

	sour-dough	wheat	total
without cheese	10%	15%	25%
with cheese	55%	20%	75%
total	65%	35%	100%

9. What is the probability that a randomly selected customer would order sourdough bread?
P(sourdough bread) =

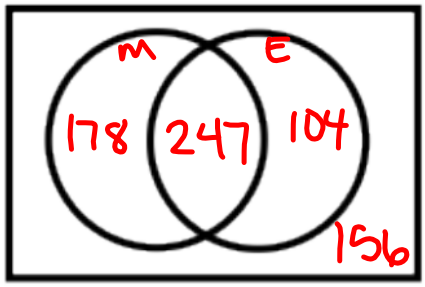
10. What is the probability that a randomly selected customer would order sourdough bread without cheese?

8.50 x 11.00 in

May 15-11:43 AM

Notation	2-way Table
Key: Male = M Female = F Eats Breakfast = E Doesn't Eat Breakfast = D Sample size = 685 P(E) = $\frac{351}{685}$ P(E|M) = $\frac{247}{425}$ P(E∩M)= $\frac{247}{685}$ P(E|F) = $\frac{104}{260}$ P(E∩F) = $\frac{104}{685}$	

	Eats	Doesn't	Total
Male	247	178	425
Female	104	156	260
Total	351	334	685

Venn Diagram	Tree Diagram
	0.62(685) = 425 0.58(425) = 247 M (62%) E (58%) = 247 D (42%) = 178 0.40(260) = 104 F (38%) 260 E (40%) = 104 D (60%) = 156 0.38(685) =

Does this data surprise you? Why or why not.

8.50 x 11.00 in

9.5 Freddy Revisited

A Solidify Understanding Task

Once Tyrell helped Freddy out in determining the amount and type of food Freddy should prepare each day for his restaurant, Freddy's food waste decreased dramatically. Still, Freddy noticed that during the week, he seemed to still have more food prepared than he needed, and sometimes on the weekend he would run out of something he needed. Tyrell said another level of determining waste could be if Freddy averaged the number of orders he received of fish and chicken on a weekday and compared it to the average number of orders he received of each on the weekend. Freddy thought this was a good idea so started collecting data. After two months, he had enough information to create a two way table representing the average number of orders he received on the weekdays and on the weekends for fish and chicken. The data is below:

	Chicken	Fish	Total
Weekday	65	79	144
Weekend	88	107	195
Total	153	186	339

1. What observations can you make? Explain to Freddy what this means (When does Freddy seem to have the greatest business? Should he expect a greater percentage of customers to order fish during the week or on the weekend? What else?)

More orders on weekend; more fish on weekends.

2. Does the number of orders of chicken compared to fish depend on whether it is a weekday or a weekend? What values from the table tell you this?

$P(C|WE) = \frac{88}{195} = 0.451 = 45\%$

$P(F|WE) = \frac{107}{195} = 0.548 = 55\%$

$P(C|WD) = \frac{65}{144} = 0.451 = 45\%$

$P(F|WD) = \frac{79}{144} = 0.548 = 55\%$

The probability of fish or chicken orders is the same, no matter if it is a weekend or weekday.

9.6 Striving for Independence

A Practice Understanding Task

$P(C|WE) = \frac{P(C \cap WE)}{P(WE)}$

Use your knowledge of conditional probability (the probability of *A* given *B* as $P(A \text{ and } B)/P(B)$) as well as the definition of independence (two events (A and B)) are said to be independent if $P(A|B) = P(A)$ *and* $P(B|A) = P(B)$) to answer the following questions. Keep track of how you are determining independence for each type of representation.

1. Out of the 2000 students who attend a certain high school, 1400 students own cell phones, 1000 own a tablet, and 800 have both. Suppose a student is randomly selected. Create a Venn diagram model and use notation to answer the following questions.

   a) What is the probability that a randomly selected student owns a cell phone?

   $P(C) = \frac{1400}{2000} = 70\%$

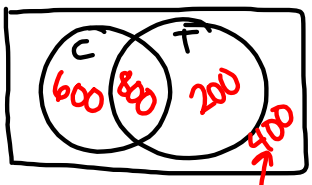
   b) What is the probability that a randomly selected students owns both a cell phone and a tablet? $P(C \cap T) = \frac{800}{2000} = 40\%$

   c) If a randomly selected student owns a cell phone (was one of the 1400 with a phone), what is the probability that this student also owns a tablet? $P(T|C) = \frac{800}{1400} = 0.571 = 57.1\%$

   d) How are questions c and b different? Smaller total in C, because c is conditional. b is only the intersection.

   e) Are the outcomes *owns a cell phone* and *owns a tablet* independent? Explain. No, see below →

   f) If question *e* is not independent, what number of students would own a tablet to create independence?



$2000 - 600 - 800 - 200$

$P(A|B) = P(A)$ and $P(B|A) = P(B)$ — if independent, both have to be true.

$P(T|C) \stackrel{?}{=} P(T)$ → $\frac{800}{1400} \stackrel{?}{=} \frac{1000}{2000}$ not independent

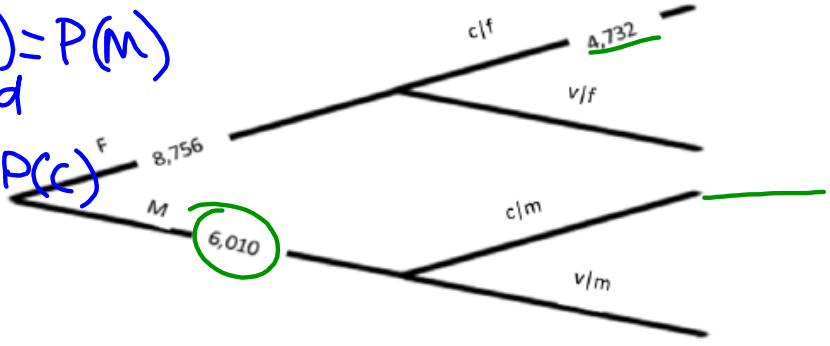
$P(C|T) \stackrel{?}{=} P(C)$ → $\frac{800}{1000} \stackrel{?}{=} \frac{1400}{2000}$

2. Below is a partially completed tree diagram from the task *Chocolate vs Vanilla*.

   a) Circle the parts of the diagram you would use to determine if choosing chocolate is independent of being a male or female. A B

   b) Complete the diagram so that choosing chocolate is independent of being male or female.

$P(M|C) = P(M)$ and $P(C|M) = P(C)$



3. Use the titanic data below to answer the following questions.

	Survived	Did not survive	Total
Men	146	659	805
Women	296	106	402
Total	442	765	1207

a. Determine if survival was independent of gender. Explain.
b. If gender would not have mattered, what would have been the number of males that would have survived, given the data for the number of females who survived and the total number of passengers on the ship.

4. Determine whether the second scenario would be dependent or independent of the first scenario. Explain.

D I

a) Rolling a six-sided die, then drawing a card from a deck of 52 cards. I
b) Drawing a card from a deck of 52 cards, then drawing another card from the same deck. D
c) Rolling a six-sided die, then rolling it again. I
d) Pulling a marble out of a bag, replacing it, then pulling a marble out of the same bag. I
e) Having 20 treats in five different flavors for a soccer team, with each player taking a treat. D

5. The definition of independence is that two events (A and B) are said to be independent if

$$P(A|B) = P(A) \text{ and } P(B|A) = P(B)$$

Explain what this looks like in a Venn diagram, a tree diagram, and a two-way table.

Homework

9.5 Set, Go (pgs.23-24)

&

9.6 Set (pgs.27-28)

Mar 28-9:36 AM