

Homework 5.3 Conditional Probability from Tables

Correlation of Cancer and Smoking

	Has been a smoker for 10+ years	Has not been a smoker
Has not developed lung cancer	202	270
Has developed lung cancer	23	5

How does the table indicate there is a connection between smoking and lung cancer?

Using the 500 data points from the table, you can make reasonable estimates about the population at large by using probability. In order to investigate the table using probability, use the following outcomes:

S- The event that a person is a smoker

L-The event that person develops lung cancer

1. Find each of these probabilities (write as percentages):

a) $P(S)$

b) $P(S')$

c) $P(L)$

d) $P(L')$

e) $P(L \cap S)$

f) $P(S' \cap L')$

g) $P(S' \cap L)$

h) $P(S \cap L')$

i) $P(S \cup L)$

j) $P(S' \cup L')$

Mrs. Koehler surveyed 430 men and 200 women about their vehicles. Of those surveyed, 160 men and 85 women said they own a blue vehicle.

	Blue	Not Blue
Men		
Women		

2. If a randomly chosen person is a man, what is the probability of that person having a blue car?

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How does the table indicate there is a connection between smoking and lung cancer?

Using the 500 data points from the table, you can make reasonable estimates about the population at large by using probability. In order to investigate the table using probability, use the following outcomes:

S- The event that a person is a smoker

L-The event that person develops lung cancer

a) $P(S) = \frac{225}{500} = 45\%$	b) $P(S') = \frac{275}{500} = 55\%$	c) $P(L) = \frac{28}{500} = 5.6\%$
d) $P(L') = \frac{472}{500} = 94.4\%$	e) $P(L \cap S) = \frac{23}{500} = 4.6\%$	f) $P(S' \cap L') = \frac{270}{500} = 54\%$
g) $P(S' \cap L) = \frac{5}{500} = 1\%$	h) $P(S \cap L') = \frac{202}{500} = 40.4\%$	i) $P(S \cup L) = \frac{230}{500} = 46\%$
j) $P(S' \cup L') = \frac{477}{500} = 95.4\%$		

1. Find each of these probabilities (write as percentages):

Mrs. Koehler surveyed 430 men and 200 women about their vehicles. Of those surveyed, 160 men and 85 women said they own a blue vehicle.

	Blue	Not Blue
Men	160	270
Women	85	115

2. If a randomly chosen person is a man, what is the probability of that person having a blue car?

$$\frac{16}{43}$$

Homework 5.3 Conditional Probability from Tables (Page 2)

3. A random survey was taken to gather information about grade level and car ownership status of students at a school. This table shows the results of the survey.

	Owns a Car	Does Not Own a Car	TOTAL
Junior	6	10	16
Senior	12	8	20
TOTAL	18	18	36

- a) Find the probability that a randomly selected student will be a junior, given that the student owns a car.
- b) Find the probability that a randomly selected student will own a car, given that the student is a senior.
4. The table below shows numbers of registered voters by age in the United States in 2004 based on the census. Find each probability in decimal form.

Age	Registered Voters (in thousands)	Not Registered to Vote (in thousands)
18-24	14,334	13,474
25-44	49,371	32,763
45-64	51,659	19,355
65 and over	26,706	8,033

- a) Find the probability that a randomly selected person is registered to vote, given that the person is between the ages of 18 and 24.
- b) Find the probability that a randomly selected person is not registered to vote, given that they are 65 and over.
- c) Find the probability that a randomly selected person is between the ages of 45 and 64 and is not registered to vote.

3. A random survey was taken to gather information about grade level and car ownership status of students at a school. This table shows the results of the survey.

Car Ownership by Grade			
	Owns a Car	Does Not Own a Car	TOTAL
Junior	6	10	16
Senior	12	8	20
TOTAL	18	18	36

- a) Find the probability that a randomly selected student will be a junior, given that the student owns a car.

$$\frac{1}{3}$$

- b) Find the probability that a randomly selected student will own a car, given that the student is a senior.

$$\frac{3}{5}$$

4. The table below shows numbers of registered voters by age in the United States in 2004 based on the census. Find each probability in decimal form.

Age	Registered Voters (in thousands)	Not Registered to Vote (in thousands)
18-24	14,334	13,474
25-44	49,371	32,763
45-64	51,659	19,355
65 and over	26,706	8,033

- a) Find the probability that a randomly selected person is registered to vote, given that the person is between the ages of 18 and 24.

$$0.52$$

- b) Find the probability that a randomly selected person is not registered to vote, given that they are 65 and over.

$$0.23$$

- c) Find the probability that a randomly selected person is between the ages of 45 and 64 and is not registered to vote.

$$0.09$$

Homework 5.3 Conditional Probability from Tables (Page 3)

5. A faculty advisor at Ridge High School surveyed 100 students about their preference for a social event. Of the 100 students surveyed, 50 were tenth graders and 50 were eleventh graders. Of the tenth graders, 30 chose a bowling party and 20 chose a dance. Of the eleventh graders, 20 chose a bowling party and 30 chose a dance.

a) Make a two way frequency table to represent the data.

b) Let $T = 10^{\text{th}}$ graders, $E = 11^{\text{th}}$ graders, $B = \text{Bowling}$, and $D = \text{Dance}$

Find $P(B)$.

Find $P(B|T)$.

6. A faculty advisor at Ridge High School surveyed 100 students about their preference for a social event. Of the 100 students surveyed, 50 were tenth graders and 50 were eleventh graders. Of the tenth graders, 30 chose a bowling party and 20 chose a dance. Of the eleventh graders, 20 chose a bowling party and 30 chose a dance.

b) Make a two way frequency table to represent the data.

	10 th Graders	11 th Graders
Bowling Party	30	20
Dance	20	30

b) Let T = 10th graders, E = 11th graders, B = Bowling, and D = Dance

Find $P(B)$. $\frac{1}{2}$

Find $P(B|T)$. $\frac{3}{5}$