

SELF-CHECK: A survey was done of commuters in three major cities about how they primarily got to work. The results are shown in the frequency table below. Answer the following conditional probability questions.

(a) What is the probability that a person picked at random would take a train to work given that they live in Los Angeles?

$$P(\text{train} | \text{LA})$$

	Car	Train	Walk	Total
New York	.05	.25	.10	.40
Los Angeles	.18	.12	.05	.35
Chicago	.08	.14	.03	.25
Total	.31	.51	.18	1.00

(b) What is the probability that a person picked at random would live in New York given that they drive a car to work?

$$P(\text{NYC} | \text{Car})$$

(c) Is it more likely that a person who takes a train to work lives in Chicago or more likely that a person who lives in Chicago will take a train to work? Support your work using conditional probabilities.

When finished, scroll to the next page for answers.

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$$P(\text{rain/LA}) = \frac{P(\text{train and LA})}{P(\text{LA})} = \frac{.12}{.35} \text{ OR } .34$$

(b) What is the probability that a person picked at random would live in New York given that they drive a car to work?

$$P(\text{NYC/Car}) = \frac{P(\text{NYC and Car})}{P(\text{Car})} = \frac{.05}{.31} \text{ OR } .16$$

(c) Is it more likely that a person who takes a train to work lives in Chicago or more likely that a person who lives in Chicago will take a train to work? Support your work using conditional probabilities.

Because we are comparing probabilities, it would be easier to compare decimals instead of fractions. In this case, we will be reducing the fractions in our calculator.

$$P(\text{Train/Chicago}) = \frac{P(\text{Train and Chicago})}{P(\text{Chicago})} = \frac{.14}{.25} \text{ OR } .56$$

$$P(\text{Chicago/Train}) = \frac{P(\text{Chicago and Train})}{P(\text{Train})} = \frac{.14}{.51} \text{ OR } .27$$

It is more likely that a person who takes the train to work lives in Chicago.

If any of this was confusing, you should come to Katherine's office hours at 11:00 AM and review it with her. After reviewing with her, continue the problem set.

REGENTS PROBLEM SET:

1. A survey about television-viewing preferences was given to randomly selected freshmen and seniors at Fairport High School. The results are shown in the table below.

Favorite Type of Program

	Sports	Reality Show	Comedy Series
Senior	83	110	67
Freshman	119	103	54

A student response is selected at random from the results. State the *exact* probability the student response is from a freshman, given the student prefers to watch reality shows on television.

2. The guidance department has reported that of the senior class, 2.3% are members of key club, K , 8.6% are enrolled in AP Physics, P , and 1.9% are in both. Determine the probability of P given K , to the nearest tenth of a percent.

3. Data collected about jogging from students with two older siblings are shown in the table below.

	Neither Sibling Jogs	One Sibling Jogs	Both Siblings Jog
Student Does Not Jog	1168	1823	1380
Student Jogs	188	416	400

Using these data, determine whether a student with two older siblings is more likely to jog if one sibling jogs or if both siblings jog. Justify your answer.

4. A study was designed to test the effectiveness of a new drug. Half of the volunteers received the drug. The other half received a sugar pill. The probability of a volunteer receiving the drug and getting well was 40%. What is the probability of a volunteer getting well, given that the volunteer received the drug?

SUMMARY: A spinner is spun around a circle that is divided up into eight equally sized sectors. What is more likely: getting a multiple of four given we spun an even or getting an odd, given we spun a number greater than 2? Support your answer.

