

## HW 8.6

1. When an avocado is selected at random from those delivered to a food store, the probability that it is ripe is 0.12, the probability that it is bruised is 0.054, and the probability that it is ripe and bruised is 0.019.
  - a. Rounding your answers to the nearest thousandth where necessary, find the probability that an avocado randomly selected from those delivered to the store is
    - i. Not bruised.
  
    - ii. Ripe given that it is bruised.
  
    - iii. Bruised given that it is ripe.
  
  - b. Which is larger, the probability that a randomly selected avocado is bruised given that it is ripe or the probability that a randomly selected avocado is bruised? Explain in words what this tells you.
  
  - c. Are the events “ripe” and “bruised” independent? Explain.
  
2. Return to the probability information given in Problem 1. Complete the hypothetical 1000 table given below, and use it to find the probability that a randomly selected avocado is bruised given that it is not ripe. (Round your answer to the nearest thousandth.)

	<b>Ripe</b>	<b>Not Ripe</b>	<b>Total</b>
<b>Bruised</b>			
<b>Not Bruised</b>			
<b>Total</b>			

3. According to the U.S. census website ([www.census.gov](http://www.census.gov)), based on the U.S. population in 2010, the probability that a randomly selected man is 65 or older is 0.114, and the probability that a randomly selected woman is 65 or older is 0.146. In the questions that follow, round your answers to the nearest thousandth:
- If a man is selected at random and a woman is selected at random, what is the probability that both people selected are 65 or older? (Hint: Use the multiplication rule for independent events.)
  - If two men are selected at random, what is the probability that both of them are 65 or older?
  - If two women are selected at random, what is the probability that neither of them is 65 or older?
4. In a large community, 72% of the people are adults, 78% of the people have traveled outside the state, and 11% are adults who have not traveled outside the state.
- Using a Venn diagram or a hypothetical 1000 table, calculate the probability that a randomly selected person from the community is an adult and has traveled outside the state.
  - Use the multiplication rule for independent events to decide whether the events “is an adult” and “has traveled outside the state” are independent.
5. In a particular calendar year, 10% of the registered voters in a small city are called for jury duty. In this city, people are selected for jury duty at random from all registered voters in the city, and the same individual cannot be called more than once during the calendar year.
- What is the probability that a registered voter is not called for jury duty during a particular year?
  - What is the probability that a registered voter is called for jury duty two years in a row?

6. A survey of registered voters in a city in New York was carried out to assess support for a new school tax. 51% of the respondents supported the school tax. Of those with school-age children, 56% supported the school tax, while only 45% of those who did not have school-age children supported the school tax.
- a. If a person who responded to this survey is selected at random, what is the probability that
    - i. The person selected supports the school tax?
    - ii. The person supports the school tax given that she does not have school-age children?
  - b. Are the two events “has school-age children” and “supports the school tax” independent? Explain how you know this.
  - c. Suppose that 35% of those responding to the survey were over the age of 65 and that 10% of those responding to the survey were both over age 65 and supported the school tax. What is the probability that a randomly selected person who responded to this survey supported the school tax given that she was over age 65?

**Answers**

- |  |  |              |           |
|--|--|--------------|-----------|
| 1ai .0.946   | 1aii. 0.352                                  | 1aiii. 0.158 |           |
| 1b. $P(\text{bruised given ripe})=.158$ , $P(\text{bruised})=.054$ | Ripe avocados are more likely to be bruised. |              | 1c. No.   |
| 2. 0.04  |  |              |           |
| 3a. 0.017  | 3b. 0.013                                    | 3c. 0.729    |           |
| 4a. 0.61   | 4b. No                                       |              |           |
| 5a.0.9   | 5b. 0.01                                     |              |           |
| 6ai. 0.51  | 6aii. 0.45                                   | 6b. No       | 6c. 0.286 |