

Write all probabilities as a percent rounded to one decimal place, if necessary.

1. Complete the following table using sums from rolling two dice. Use the table to answer questions 2-5.

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

2. 2 fair dice are rolled. What is the probability that the sum is even given that the first die that is rolled is a 2? **50%**

3. 2 fair dice are rolled. What is the probability that the sum is even given that the first die rolled is a 5? **50%**

4. 2 fair dice are rolled. What is the probability that the sum is odd given that the first die rolled is a 5? **50%**

5. Steve and Scott are playing a game of cards with a standard deck of playing cards. Steve deals Scott a black king. What is the probability that Scott's second card will be a red card? **26/51**

6. Sandra and Karen are playing a game of cards with a standard deck of playing cards. Sandra deals Karen a red seven. What is the probability that Karen's second card will be a black card? **26/51**

7. Donna discusses with her parents the idea that she should get an allowance. She says that in her class, 55% of her classmates receive an allowance for doing chores, and 25% get an allowance for doing chores and are good to their parents. Her mom asks Donna what the probability is that a classmate will be good to his or her parents given that he or she receives an allowance for doing chores. What should Donna's answer be? **.25/.55 = 45.5%**

8. At a local high school, the probability that a student speaks English and French is 15%. The probability that a student speaks French is 45%. What is the probability that a student speaks English, given that the student speaks French?  
**.15/.45 = 33.3%**

9. On a game show, there are 16 questions: 8 easy, 5 medium-hard, and 3 hard. If contestants are given questions randomly, what is the probability that the first two contestants will get easy questions? **23.3%**

10. On the game show above, if the first contestant got an easy question, what is the probability the second contestant will get a hard question? **20%**

11. Figure 2.2 shows the counts of earned degrees for several colleges on the East Coast. The level of degree and the gender of the degree recipient were tracked. Row & Column totals are included.

- What is the probability that a randomly selected degree recipient is a female?
- What is the probability that a randomly chosen degree recipient is a man?
- What is the probability that a randomly selected degree recipient is a woman, given that they received a Master's Degree?
- For a randomly selected degree recipient, what is  $P(\text{Bachelor's Degree}|\text{Male})$ ?

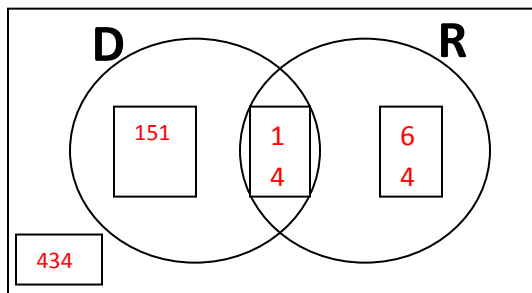
	Bachelor's	Master's	Professional	Doctorate	Total
Female	542	128	26	18	714
Male	438	165	38	20	661
Total	980	293	64	38	1375

12. Animals on the endangered species list are given in the table below by type of animal and whether it is domestic or foreign to the United States. Complete the table and answer the following questions. An endangered animal is selected at random. What is the probability that it is:

- a bird found in the United States?  
 **$78/663 = 11.8\%$**
- foreign or a mammal?  **$498/663 + 314/663 - 251/663 = 84.6\%$**
- domestic?  **$165/663$  or  $55/221$  or  $24.9\%$**
- a bird given that it is found in the United States?  **$14/165 = 8.5\%$**
- a bird given that it is foreign?  **$175/498 = 35.1\%$**

	Mammals	Birds	Reptiles	Amphibians	Total
Domestic	63	78	14	10	165
Foreign	251	175	64	8	498
Total	314	253	78	18	663

13. Using the table in #10, fill in the Venn Diagram looking at the events **D**: Domestic and **R**: Reptiles.



Answer the questions below.

- a.  $P(D \text{ and } R)$   $14/663$  or 2.1%      b.  $P(D \text{ or } R)$   $229/663$  or 34.5%      c.  $P(R^c)$   $585/663$  or 88.2%

d.  $P(D \mid R)$   $14/78$  or 17.9%

e.  $P(R \mid D)$   $14/165$  or 8.5%

f. Write in words what part d.) and part e.) notation means and although they appear similar, why are their probabilities different? **Asking for two different subsets. Overlap/circle R vs. overlap/circle D**

g. Challenge! Explain what  $P(R^c \mid D)$  is asking for and then find: **Probability of not being a reptile given that the animal is domestic.  $151/165$  or 91.5%**

14. Every morning I buy either the Times or The Mail. The probability that I buy the Times is  $\frac{3}{4}$  and the probability that I buy the Mail is  $\frac{1}{4}$ . If I buy the Times, the probability that I complete the crossword is  $\frac{2}{5}$ , whereas if I buy the Mail the probability that I complete the crossword is  $\frac{4}{5}$ .

a. Draw a tree diagram with the probability to represent this situation.

b. In fraction form, find  $P(\text{do not complete the crossword} \mid \text{I buy The Mail})$ .

c. Find the probability that I complete the crossword on any particular day.

d. *Challenge!* If I completed the crossword, find the probability that I bought The Mail.

15. A group of 64 people were surveyed about the type of movies they prefer. 12 females preferred romantic comedies, 10 females preferred action movies, and 3 females preferred horror movies. 8 males preferred romantic comedies, 25 males preferred action movies, and 6 males preferred horror movies.

a. Construct a two-way frequency table to organize this data.

- b. Let  $F$  be the event that the person is female. Find  $P(F)$  .
- c. Let  $R$  be the event that the person prefers romantic comedies. Find  $P(R)$  .
- d. Find  $P(F|R)$  and  $P(R|F)$  . Explain how these two calculations are different.
- e. Are events  $F$  and  $R$  independent? Justify your answer.