1 The probability of rolling a 6 on an honest die is 1/6. If you roll an honest die ten times and none of the rolls comes up 6, is the probability of rolling a 6 on the next roll less than 1/6, equal to 1/6, or greater than 1/6? Explain why. Hint: Google *gambler's fallacy* and *law of very large numbers*.

2 What is sampling with replacement and why is it used?

3 The percentages of people in the United States with each blood type are O = .46, A= .40, B = .10, AB = .04.

What is the probability that two people getting married both have blood type O? What assumption are you making?

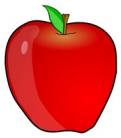
4 Given the above statistics, What is the probability that two people getting married both have the same blood type? What assumptions are you making?

Do you think your assumptions are reasonable?

5 A booster rocket has **six** gaskets, each with a .977 reliability rating. For a successful launch, all six gaskets must function correctly. If all do not function correctly, the rocket explodes. This actually happened to the space shuttle *Challenger* in 1986. Assuming that the gaskets hold or fail independently, what is the chance of an explosion?

6 Suppose that you have a basket full of the following fruit: 2 apples, 3 bananas, 3 oranges.

a. What is the probability of randomly selecting one apple from the basket.



b. What is the probability of randomly picking an orange or a banana?

c. What is the probability of picking an apple and then an orange and then an apple (**without** replacement)?

28% of a certain breed of rabbits are born with **long hair**. Assume that the distribution is random, and consider a **litter of five** rabbits.

How many rabbits in this litter would we expect to have long hair?

7 What is the probability that all of the rabbits in the litter have short hair?

Fill in the table and then use the completed table to answer questions below:

	Liberal	Moderate	Conservative	**TOTAL**
High School only	.07	.40		.60
College	.20		.10	
TOTAL		.50	.23	1.00

- What is the probability of selecting a person in this population who has been to college?
- What is the probability of selecting a person with high school only education who is also a conservative?
- Given that a person is liberal, what's the probability that he/she has been to college?

8

For fun on Saturday night, you and a friend are going to flip a fair coin 10 times (Geek!). Let H be the event that a flip lands with heads showing, and let T be the event that a flip lands with tails showing. Because the coin is fair, assume P (H) = P (T) = 0.5. Neither of you know how to flip the coin to obtain some desired outcome.

You flip: HTHHTHTTTH
Your friend flips: HHHHHHHTTT

- Which sequence is more likely to occur?
- Do a quick Google search for something called the "representativeness heuristic." Explain how it applies to subjective proability assessment in this experiment with coins.
- Provide an alternative example (you will find on various websites) of how the representativeness heuristic might influence real-life judgment.

9

Adapted from K. Taylor, 2010 and http://www.stat.duke.edu/~jerry/sta101/extraproblems/probans.htm