Honors Statistics
3.4: Multiplication Rule: Basics

Describe the events as independent of dependent.

1. Selecting a king from a standard deck, replacing it, and then selecting a queen.
2. Returning a rented movie after the due date and receiving a late fee.
3. Rolling a six-sided die and then rolling the die a second time so that the sum of the two rolls is seven.
4. A numbered ball between 1 and 52 is selected, replaced, and then a second numbered ball is selected.

Consider drawing cards from a standard deck of 52 cards.
Two cards are selected. Find the probability of selecting:

5. a king and then a queen (with replacement).
6. a king and then a queen (without replacement).
7. a red card and then another red card (with replacement).
8. a red card and then anothe red card (without replacement).

In a sample of 1000 people, 120 are left-handed. Two unrelated people are selected at random without replacement. (Assume independence) Find the probability that:

9. both people are left-handed.
10. neither person is left-handed
11. both people are right-handed.
12. the first person is left-handed and the second person is right-handed.
13. The first person is right -handed and the second person is left-handed.

The table shows the results of a study in which researchers examined a child's IQ and the presence of a specific gene in the child.

	Gene present	Gene not present	**Total**
High IQ	33	19	52
Normal IQ	39	11	50
Total	72	30	102

Find the probability of choosing a child that:

14. has a high IQ.
15. does not have the gene.
16. has the gene present **and** has a normal IQ.
17. does not have the gene **and** has a high IQ.

A manufacturer of light bulbs knows that there is a defect rate of 5%. 3 bulbs are randomly selected from a batch of 1000 light bulbs.

18. Can you assume independence when selecting 3 bulbs from 1000? Explain.
19. Find the probability that all of the bulbs are defective.
20. Find the probability that none of the bulbs are defective.