Problem Set for Chapter 6: Probability
Eco249 Statistics   Queens College   K. Matsuda

Exercises for Your Better Understanding (You don't have to hand in these.)

Exercise 6.2 on page 156 (You can find the solution on the required textbook.)
A sportscaster states that he believes that the probability that the NY Yankees will win the World Series this year is 25%.
   a. Which method was used to assign that probability?
   b. How would you interpret the probability?

Exercise 6.8 on page 156 (You can find the solution on the required textbook.)
The manager of a computer store has kept track of the number of computers sold per day. On the basis of this information, the manager produced the following list of the number of daily sales.

Number of computers sold	Probability
0	.08
1	.17
2	.26
3	.21
4	.18
5	.10

   a. If we define the experiment as observing the number of computers sold tomorrow, determine the sample space.
   b. Use set notation to define the event, sell more than 3 computers.
   c. What's the probability of selling 5 computers?
   d. What's the probability of selling 2, 3, or 4 computers?
   e. What's the probability of selling 6 computers?

Exercise 6.34 on page 164 (You can find the solution on the required textbook.)
To determine whether drinking alcoholic beverages has an effect on the bacteria that cause ulcers, researchers developed the following table of joint probabilities.

Number of alcoholic drinks per day	Ulcer	No ulcer
None	.01	.22
One	.03	.19
Two	.03	.32
More than two	.04	.16

    a. What proportion of people have ulcers?
    b. What is the probability that a teetotaler (no alcoholic beverages) develops an ulcer?
    c. What is the probability that someone who has an ulcer does not drink alcohol?
    d. Are ulcers and the drinking of alcohol independent? Explain.

Exercise 6.28 on page 163 (You can find the solution on the required textbook.)
A department store analyzed its most recent sales and determined the relationship between the way the customer paid for the item and the price category of the item. The joint probabilities in the following table were calculated.

	Cash	Credit Card	Debit Card
Under $20	.09	.03	.04
$20 - $100	.05	.21	.18
Over $100	.03	.23	.14

    a. What proportion of purchases was paid by debit card?
    b. Find the probability that a credit card purchase was over $100.
    c. Determine the proportion of purchases made by credit card or by debit card,

Exercise 6.50 on page 172 (You can find the solution on the required textbook.)
Given the following probabilities, draw a probability tree to compute the joint probabilities.

$P(A) = .8$ $P(A^C) = .2$
$P(B|A) = .3$ $P(B|A^C) = .3$

Exercise 6.52 on page 172 (You can find the solution on the required textbook.)
Approximately 10% of people are left-handed. If two people are selected at random, what is the probability of the following events?
    a. Both are right-handed.
    b. Both are left-handed.
    c. One is right-handed and the other is left-handed.
    d. At least one is right-handed.

Exercise 6.66 on page 173 (You can find the solution on the required textbook.)
A financial analyst has determined that there is a 22% probability that a mutual fund will outperform the market over a 1-year period provided that it outperformed the market the previous year. If only 15% of mutual funds outperform the market during any year, what is the probability that a mutual fund will outperform the market 2 years in a row?

Exercise 6.64 on page 173 (You can find the solution on the required textbook.)
Researchers at University of Pennsylvania School of Medicine have determined that children under 2 years old who sleep with the lights on have a 36% chance of becoming myopic before they are 16. Children who sleep in darkness have a 21% probability of becoming myopic. A survey indicates that 28% of children under 2 sleep with some light on. Find the probability that a child under 16 is myopic.

For further exercises refer to Chapter 6 of the textbook.