Section 6.3: Probability

Exercises

1. A fair twelve-sided die is rolled. What is the probability that the roll is

   a) a 7?
   b) even?
   c) greater than 5?
   d) not a 7?
   e) a 1 or a 2?

2. Two four-sided dice are rolled. What is the probability that the roll

   a) results in the same number on both dice?
   b) results in different numbers on both dice?
   c) has a sum of 6?
   d) has at least one die rolling a 3?

3. (You may wish to consult your work for section 4.2 for this question) A two-digit number is generated at random. What's the probability that this number is divisible by 7?

4. (Again, consult your work for 4.2) In a psychology experiment, a person claiming to have ESP draws 3 cards from a set of six. If the person is asked what are the three symbols (in any order) on the cards he's drawn, what's the probability that he'll get it right if he guesses randomly?

5. An individual is presented with three different glasses of soft drink, labeled A, B, and C. He is asked to taste all three and then list them in order of preference. Suppose that the same soft drink has actually been put into all three glasses.

   a) How many outcomes are there in this experiment? What probability would you assign to each one?
   b) What is the probability that A is ranked first?
   c) What is the probability that either B or C is ranked first?
   d) What is the probability that A is ranked first and B is ranked last?

6. Your ATM/debit card has a four-digit PIN number associated with it. If there are no restrictions on what digits or what order you can pick them, then

   a) how many PIN numbers are possible?
   b) what is the probability that someone could guess your PIN randomly?
   c) if that person saw you input the first two digits when you were at the grocery checkout counter, what are their chances of guessing your PIN correctly now?

Complete the following exercises involving contingency tables

7. One hundred students each from the Computing Systems Technology program and from the English department were asked who is the greatest fictional wizard ever, with the following results.

	Gandalf	Dumbledore	total
CST	90	10	
English	40	60	
total			

a) Calculate P(G).
b) Calculate P(C|G).
c) Calculate P(G|C).
d) Calculate P(E or D).

8. A sampling of CST faculty and students were asked what operating system they used on their home computer, with the following results.

	Windows	Linux
faculty	6	2
students	24	8

a) What's the probability that a random CST user (faculty or student) will have Linux on their home machine?
b) What's the probability that a random CST **student** will have Linux on their home machine?
c) Are the events "student" and "Linux user" independent?

9. One thousand television watchers from BC and Alberta were asked if they watched the Rick Mercer Report on CBC with the following results.

	Yes	No
BC	500	500
AB	250	750

a) What's the probability that one of these people, when selected randomly, is from BC or watches the RMR?
b) What's the probability that one of these people, when selected randomly, is from BC and watches the RMR?

c) What's the probability that one of these people, when selected randomly, is from Alberta and does not watch the RMR?
d) What's the probability that a Rick Mercer watcher is from BC?
e) What's the probability that a British Columbian watches Rick Mercer?

10. A roving reporter surveyed all of the patrons inside the Starbucks and the Moka House coffee houses in Cook Street Village (it was a slow news day). The beverage each patron was drinking was noted and summarized in the following table.

	coffee	tea	other
Starbucks	45	9	6
Moka House	30	8	2

a) Are the events "drinking coffee" and "Starbucks" independent?
b) Are the events "tea" and "Moka House" independent?

11. StatsCan surveyed one hundred Canadians and found that 60 of them exercise regularly, 75 of them eat healthy diets, and 45 of them do both.

a) Complete the following contingency table using the above information

	exercise regularly	don't exercise regularly	total
healthy diet			
unhealthy diet			
total			

b) If one of these Canadians is selected randomly, what is the probability that this person exercises regularly but does not eat a healthy diet?
c) If one of these Canadians is selected randomly, what is the probability that this person exercises regularly or eats a healthy diet?
d) Is eating a healthy diet independent of exercising regularly for this sample of Canadians?