Exercise Set II.1

1. (2.4, 2.8) An experiment involves tossing a pair of dice, 1 green and 1 red, and recording the numbers that come up. If x equals the outcome on the green die and y the outcome on the red die, describe the sample space S
   (a) by listing the elements $\{x, y\}$,
   (b) by using the rule method,
   (c) List the elements corresponding to the event A that the sum is greater than 8,
   (d) List the elements corresponding to the event B that a 2 occurs on either die,
   (e) List the elements corresponding to the event C that a number greater than 4 comes up on the green die,
   (f) List the elements corresponding to the event $A \cap C$,
   (g) List the elements corresponding to the event $A \cap B$,
   (h) List the elements corresponding to the event $B \cap C$,
   (i) Construct a Venn diagram to illustrate the intersections and unions of the events A. B and C.

Exercise Set II.2

2 (2.23) If an experiment consists of throwing a die and then drawing a letter at random from the English alphabet, how many points are there in the sample space?

3 (2.29) In a fuel economy study, each of 3 race cars is tested using 5 different brands of gasoline at 7 test sites located in different regions of the country. If 2 drivers are used in the study, and test runs are made once under each distinct set of conditions, how many test runs are needed?

4 (2.51) Find the errors in each of the following statements:

(a) The probabilities that an automobile salesperson will sell 0, 1, 2, or 3 cars on any given day in February are, respectively, 0.19, 0.38, 0.29, and 0.15.

(b) The probability that it will rain tomorrow is 0.40 and the probability that it will not rain tomorrow is 0.52.

(c) The probabilities that a printer will make 0, 1, 2, 3, or 4 or more mistakes in setting a document are, respectively, 0.19, 0.34, -0.25, 0.43, and 0.29.

(d) On a single draw from a deck of playing cards the probability of selecting a heart is 1/4, the probability of selecting a black card is 1/2, and the probability of selecting both a heart and a black card is 1/8.

Exercise Set II.3

5 (2.53) A box contains 500 envelopes of which 75 contain \$100 in cash, 150 contain \$25, and 275 contain \$10. An envelope may be purchased for \$25. What is the sample space for the different amounts of money? Assign probabilities to the sample points and then find the probability that the first envelope purchased contains less than \$100.

6 (2.55) The probability that an American industry will locate in Shanghai, China is 0.7, the probability that it will locate in Beijing, China is 0.4, and the probability that it will locate in either Shanghai or Beijing or both is 0.8. What is the probability that the industry will locate

(a) in both cities?

(b) in neither city?

Exercise Set II.4

7 (2.80) In an experiment to study the relationship of hypertension and smoking habits, the following data are collected for 180 individuals:

Table: Data for Exercise II.7

	Non-smokers	Moderate Smokers	Heavy Smokers
H	21	36	30
NH	48	26	19

where *H* and *NH* in the table stand for Hypertension and Nonhypertension, respectively. If one of these individuals is selected at random, find the probability that the person is

(a) experiencing hypertension, given that the person is a heavy smoker,
(b) a non-smoker, given that the person is experiencing no hypertension.

Exercise Set II.5

8 (2.101, 2.103) In a certain region of the country it is known from past, experience that the: probability of selecting an adult over 40 years of age: with cancer is 0.05. If the probability of a doctor correctly diagnosing a person with cancer as having the disease is 0.78 and the probability of incorrectly diagnosing a person without cancer as having the disease is 0.06,

- a what is the probability that, a person is diagnosed as having cancer?
- b what is the probability that a person diagnosed as having cancer actually has the disease?