1. Do Exercise 3.88 on page 139 in the textbook. Answer parts (a)-(d) only.
Do Exercise 3.88 on page 141 in the textbook. Answer parts (a)-(d) only.

2. Do Exercise 4.10 on pages 153-4 in the textbook.
Do Exercise 4.10 on pages 157-8 in the textbook.


Recent research by Schmidt et al. (African Entomology, 1999, 7, pp 107-112) describes the effectiveness of a seed eating weevil on the population control of a nonnative, invasive species of tree in South Africa, called *Paraserianates lophantha*. A frequency distribution of percent seed damage caused by the weevil in a sample of 39 trees is provided in the following table.

<table>
<thead>
<tr>
<th>Percent Seed Damage</th>
<th>Number of trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - (10)</td>
<td>19</td>
</tr>
<tr>
<td>10 - (20)</td>
<td>2</td>
</tr>
<tr>
<td>20 - (30)</td>
<td>5</td>
</tr>
<tr>
<td>30 - (40)</td>
<td>3</td>
</tr>
<tr>
<td>40 - (50)</td>
<td>6</td>
</tr>
<tr>
<td>50 - (60)</td>
<td>2</td>
</tr>
<tr>
<td>60 - (70)</td>
<td>2</td>
</tr>
</tbody>
</table>

Suppose that one of these 39 trees is selected at random. Let

A = event the tree has less than 40% seed damage,
B = event the tree has at least 20% seed damage,
C = event the tree has at least 30% but less than 60% seed damage, inclusive
D = event the tree has at least 50% seed damage.

Describe each of the following events in words and find the number of outcomes (trees) that comprise each event.

a. not B
b. C & D
c. A or D
d. Not C
e. A & D
Exercises for Recitations

1. A family is defined to be a group of two or more persons related by birth, marriage, or adoption and residing together in a household. According to the US Bureau of the Census, the size distribution of US families is as follows. The frequencies are in thousands.

<table>
<thead>
<tr>
<th>Size</th>
<th>No. of families</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>29,765</td>
</tr>
<tr>
<td>3</td>
<td>15,771</td>
</tr>
<tr>
<td>4</td>
<td>14,421</td>
</tr>
<tr>
<td>5</td>
<td>6,234</td>
</tr>
<tr>
<td>6</td>
<td>2,182</td>
</tr>
<tr>
<td>7+</td>
<td>1,221</td>
</tr>
</tbody>
</table>

A US family is selected at random. Find the probability that the family obtained has

- a. two persons.
- b. more than three persons.
- c. between one and three persons, inclusive.
- d. one person.
- e. one or more persons.

2. As reported by Dun & Bradstreet in Business Failure Record, the numbers of commercial failures for the year 1995 by type of industry are as follows:
For a 1995 failed business selected at random, let

\[ X: \text{Event it was in either manufacturing, wholesale trade or retail} \]
\[ Y: \text{Event it was in either mining, construction or manufacturing} \]
\[ Z: \text{Event it was in either wholesale trade or retail trade.} \]

a. Use the table and the f/N rule to find \( P(Z) \).
b. Express event \( Z \) in terms of events \( E \) and \( F \).
c. Compute \( P(Z) \) using the special addition rule.
d. Determine \( P(X) \) and \( P(Y) \) using the special addition rule.
e. Determine the probability of not \( X \) using the complement rule.
f. Compute the probability of \( X \) and \( Y \).
g. Compute the probability of \( X \) or \( Y \) using the addition rule.
h. Are \( X \) and \( Z \) mutually exclusive events? Explain.

3. According to Current Population Reports, 52% of US adults are female, 9.5% are divorced, and 5.4% are divorced females. For a US adult selected at random, let

\[ F = \text{event the person is female} \]
\[ D = \text{event the person is divorced} \]

a. Obtain \( P(F) \), \( P(D) \) and \( P(F \text{ and } D) \).
b. Determine \( P(F \text{ or } D) \) and interpret your answer in terms of percentages.
c. Find the probability that a randomly selected adult is male.