1. Section 1.2

1. Given $n(A) = 60$, $n(B) = 90$, and $n(A \cap B) = 30$, what is $n(A \cup B)$?

2. Given $n(A) = 40$, $n(B) = 100$, $n(A \cup B) = 120$, and $n(A \cap B) = 20$.

   (a) What is $n(A \cap B')$?

   (b) What is $n(A' \cap B)$?

3. Given $n(A) = 200$, $n(B) = 300$, $n(A \cap B) = 100$, $n(A \cap C) = 200$, $n(B \cap C) = 200$, and $n(A \cap B \cap C) = 20$, find the following:

   (a) $n(A \cap B \cap C') = \_\_\_\_\_\_

   (b) $n(A' \cap B \cap C') = \_\_\_\_\_\_

   (c) $n(A \cup B \cup C) = \_\_\_\_\_\_

4. A social media survey of 500 teenagers gathered the following information:

   - 173 had a Snapchat account but not a Tumblr account
   - 180 had a Tumblr account but not a Snapchat account
   - 160 had both a Snapchat and Snapchat account
   - 147 had a Snapchat or Tumblr account

   (a) How many did not have any of these accounts?

   (b) How many had only a Snapchat account?

2. Section 1.3

1. A fair 6-sided die has 3 sides painted red, 2 sides painted blue, and 1 side painted white. The die is rolled and the color of the top side is observed. What is the sample space? Are the outcomes equally likely?

2. A card is drawn from a standard 52-card deck and its color is recorded. If the card is black, a coin is tossed and the upward face (heads or tails) is recorded. If the card is red, a fair 4-sided die (1-4) is tossed and the bottom number is recorded.

   (a) What is the sample space? Are the outcomes equally likely?

   (b) List the outcomes in the event "A red card is drawn."
3 Section 1.4

1. A letter is chosen at random from "FIGHTING TEXAS AGGIES" (ignore spaces). Let \( E \) be the event that a vowel is chosen and \( G \) be the event that one of the first six letters of the alphabet is chosen. List the outcomes in each of the following:

   a. \( E \cap G \)
   b. \( E \cup G \)
   c. \( E \setminus G \)
   d. \( G \setminus E \)

2. A fair six-sided die has 6 sides painted red, 2 sides painted blue, and 4 sides painted green. If a die is rolled, the color of the top side is observed. Find the probabilities for the outcomes listed below.

3. Section 1.4

1. A fair six-sided die has 6 sides painted red, 2 sides painted blue, and 4 sides painted green. If a die is rolled, the color of the top side is observed. Find the probabilities for the outcomes listed below.

4. A digit (0-9) is chosen at random. Let \( E \) be the event that the digit is a prime number, \( F \) be the event that the digit is greater than 5, and \( G \) be the event that the digit is less than 4. List the outcomes in each of the following:

   a. \( E \cup F \cup G \)
   b. \( E \cap F \cap G \)
   c. \( E \cup F \cap G \)
   d. \( E \cap F \cup G \)
   e. \( E \setminus F \setminus G \)
   f. \( E \setminus F \cap G \)
   g. \( E \cap F \setminus G \)
   h. \( E \setminus F \setminus G \)

2. A fair six-sided die (1-6) and a fair four-sided die (1-4) are tossed.

   a. What is the probability that the sum of the numbers is at least 7?
   b. What is the probability that the sum of the numbers is at least 7 and the four-sided die shows a 4 or more?
   c. What is the probability that the sum of the numbers is at least 7, the four-sided die shows a 4 or more, and the six-sided die shows a 5 or more?
3. The results of a (made-up) Texas A&M survey of 500 students on political party preference are given below:

<table>
<thead>
<tr>
<th>Choice</th>
<th>Republican</th>
<th>Democrat</th>
<th>Other</th>
<th>Political Parties are evil and need to be abolished</th>
</tr>
</thead>
<tbody>
<tr>
<td>If asked</td>
<td>255</td>
<td>120</td>
<td>18</td>
<td>7</td>
</tr>
</tbody>
</table>

What is the empirical probability that a survey taker chosen at random:

(a) is Republican?

\[ \frac{255}{500} = 0.51 \]

(b) is neither Republican nor Democrat?

\[ \frac{18 + 7}{500} = 0.046 \]