Put answers in spaces provided unless otherwise stated. SHOW ALL WORK. (No Work = No Credit) Remember that you lose points for sloppy work, not following directions, and unclear answers. Simplify answers completely unless otherwise noted.

(4 points)

1. The probability that Ramsey wins the race is \( \frac{2}{3} \).
   
   a. What are the odds that Ramsey wins?
   
   \( 2 \) to \( 1 \)

   b. What are the odds against Ramsey winning?

   \( 1 \) to \( 2 \)

(3 points)

2. The odds that Sarah wins the race are \( \frac{2}{3} \). What is the probability that Sarah wins the race?

\[ P(W) = \frac{2}{5} \]

(8 points)

3. A single card is drawn from a standard 52-card deck. Calculate each of the following.

   a. The probability that a king or heart is drawn.

   \[ P(K \text{ or } \heartsuit) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13} \]

   b. The odds that a king or heart is drawn.

   \( 4 \) to \( 9 \)

   c. The probability that a king or heart is drawn.

   \[ P(F \text{ or } B) = \frac{12}{52} + \frac{26}{52} - \frac{6}{52} = \frac{32}{52} = \frac{8}{13} \]

   d. The odds that a king or heart is drawn.

   \( 8 \) to \( 5 \)
4. There is a 60% chance it will rain today. What is the probability that it will not rain today? Leave your answer as a percentage. SHOW YOUR WORK.

\[100\% - 60\% = 40\%\]

5. A pointer is spun once on the spinner shown. The probability assigned to the pointer landing on a given integer is given:

<table>
<thead>
<tr>
<th>event</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(event)</td>
<td>0.3</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
</tr>
</tbody>
</table>

a. Find the probability that the pointer lands on an even number.

\[P(\text{even}) = 0.1 + 0.3 = 0.4\]

b. Find the probability that the pointer lands on a prime number given that it landed on an even number.

\[P(\text{prime} | \text{even}) = \frac{0.1}{0.1+0.3} = \frac{0.1}{0.4} = \frac{1}{4}\]

c. Find the probability that the pointer lands on an odd number given that it landed on a prime number.

\[P(\text{odd} | \text{prime}) = \frac{0.2+0.1}{0.1+0.2+0.1} = \frac{0.3}{0.4} = \frac{3}{4}\]

d. Test the events in part b for independence.

\[P(\text{prime} \cap \text{even}) = 0.1\]

\[P(\text{prime}) \cdot P(\text{even}) = (0.1+0.2+0.1) \cdot (0.1+0.3) = (0.4)(0.4) = 0.16\]

[Dependent]