Probability

Five counters are placed into a bag, two are white and 3 are black.

1) Place the events onto the probability line.
   a) $P(\text{Black})$
   b) $P(\text{Yellow})$
   c) $P(\text{White})$

2) Describe the probabilities of the following events in words.
   a) It will snow in June.
   b) Throwing a head on a fair coin
   c) Rolling a 7 on a standard dice.

June and George both have spinners. June's spinner has the numbers 1 to 5 and George's has the numbers 1 to 3. After spinning the spinners, they calculate the sum of their values.

3) Complete the sample space diagram

4) What is the probability of the total being greater than 6?

5) Probability of the total being 1.
6) The probability it will seed will grow is 0.6.
   a) What is the probability of a seed not growing? 
      [1/1]
   b) If I plant 200 seeds what is the expected amount that will grow? 
      [2/2]

7) I roll a fair dice what is the probability of me rolling a number that is
   a) Even 
      [1/1]
   b) Not a multiple of 3 
      [1/1]

8) If I roll a fair dice 150 times. What is the expected amount of 5’s that I will land? 
   [2/2]

Lina makes and rolls her own dice 300 times.

<table>
<thead>
<tr>
<th>Rolled No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>45</td>
<td>24</td>
<td>47</td>
<td>58</td>
<td>73</td>
<td>53</td>
</tr>
</tbody>
</table>

9) What is the relative frequency of rolling a 5 on Lina’s dice? 
   [2/2]

10) Is Lina’s dice fair? Explain your answer. 
    [3/3]

<table>
<thead>
<tr>
<th>Skill</th>
<th>Questions</th>
<th>Score</th>
<th>Available Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worded Probability</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Calculate the probability of an event happening</td>
<td>1,4,5,7a</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Calculate the probability of an event not happening</td>
<td>6a, 7b</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Completing a sample space diagram</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Expected Probability</td>
<td>6b, 8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Relative Frequency</td>
<td>9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Reasoning about bias.</td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
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Five counters are placed into a bag, two are white and 3 are black.

1) Place the events onto the probability line.
   a) P(Black)
   b) P(Yellow)
   c) P(White)

2) Describe the probabilities of the following events in words.
   a) It will snow in June. Very Unlikely
   b) Throwing a head on a fair coin Even Chance
   c) Rolling a 7 on a standard dice. Impossible

June and George both have spinners Junes has the numbers 1 to 5 and Georges has the numbers 1 to 3. After spinning the spinners they calculate the sum of their values.

3) Complete the sample space diagram

4) What is the probability of the total being greater than 6?
   \[ P(x > 6) = \frac{6}{20} = \frac{3}{10} \]

5) Probability of the total being 1.
   \[ P(\text{one}) = 0 \]
6) The probability it will seed will grow is 0.6.
   a) What is the probability of a seed not growing?
   
   \[ P(\text{not growing}) = 1 - 0.6 = 0.4 \]

   b) If I plant 200 seeds what is the expected amount that will grow?
   
   \[ \text{Expected} = 0.6 \times 200 = 120 \]
   120 seed are expected to grow.

7) I roll a fair dice what is the probability of me rolling a number that is
   a) Even
   
   \[ P(\text{Even}) = \frac{3}{6} = \frac{1}{2} \]

   b) Not a multiple of 3
   
   \[ P(\text{Not Multiple of 3}) = \frac{4}{6} = \frac{2}{3} \]

8) If I roll a fair dice 150 times. What is the expected amount of 5’s that I will land?
   
   \[ \text{Expected} = \frac{1}{6} \times 150 = 25 \]
   25 fives are expected to be rolled.

Lina makes and rolls her own dice 300 times.

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9) What is the relative frequency of rolling a 5 on Lina’s dice?
   
   \[ \text{Relative Frequency} = \frac{73}{300} \]

10) Is Lina’s dice fair? Explain your answer.
    No Lina’s dice is not fair. It is biased because I would expect to land 50 times on each number. Instead it lands 73 times on a 5 and only 24 times on a 2.