For this unit test, you should be able to:

- Determine the sample space for an event
- Construct and use tree diagrams to determine the number of outcomes or the probability of a given event
- Use the multiplication and additional principles to calculate the number of outcomes or the probability of events
- Find probability of simple events and of compound independent events

Vocabulary: (understand definitions and usage)

- addition principle
- independent events
- relative frequency
- sample space
- event
- simple event
- compound event
- complement
- counting principle
- multiplication principle
- tree diagram

1. Haley bought a CD with 10 songs on it. She placed it in her CD player and selected random play mode. Haley kept a record of how the tracks played as illustrated in the following table. Find the relative frequency of each track on the CD.

<table>
<thead>
<tr>
<th>Track</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (How many times it was played.)</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Relative frequency of each track</td>
<td>2/28 or 1/14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An experiment consists of rolling one fair number cube. Find the probability of the following events:

2. \( P(3 \text{ or } 5) \) _________
3. \( P(\text{not } 5) \) _________
4. \( P(< 5) \) _________
5. \( P(\geq 5) \) _________

An experiment consists of rolling two fair number cubes. Find the probability of each of the following events.

6. \( P(\text{sum } = 11) \) _________
7. \( P(\text{sum } = 8) \) _________
8. \( P(\text{sum } = 7) \) _________
9. \( P(\text{doubles}) \) _________

10. In a game two dice are rolled. To make the first move, you need to roll a sum of 6, 7, or 8. What is the probability that you will make the first move? _______________.

Simple and Compound Events:

Consider a regular deck of cards without the jokers. Cards are not replaced after each draw. Find the probability of each of the following.

11. \( P(\text{a diamond and a black seven}) \) 
12. \( P(\text{pair of kings}) \)

13. \( P(\text{ace of hearts and king of hearts}) \) 
14. \( P(\text{red card and black card}) \)

15. Johnny Appleseed has a bag containing 2 yellow plums, 2 red plums, and 3 purple plums. What is the probability that he will reach in without looking and pull out a yellow plum to eat, and then reach in again and pull out a purple plum to eat?

16. Katie Kipp flips a coin twice and gets heads both times. What is the probability that she will get tails the third time she flips the coin?

17. Brian tosses a coin 4 times. What is the probability he gets all tails?

18. Pithy has two boxes. Box 1 contains 3 red, 2 silver, 4 gold, and 2 blue combs. Box 2 contains one black and one clear brush. What is the probability that Pithy selects a red comb from box 1 and a black brush from box 2?

19. Sid has a bag of 12 red, 14 brown, and 10 blue marbles. He chooses one, shoots it, and chooses another. What is the probability that his first selection is a red marble, and then a blue marble?

20. Erica gets a new credit card in the mail with 10 digits. What is the probability that the last 2 digits are both 5?

21. What is the probability of Erica getting a credit card with only even numbers?

Fundamental Counting Principles:

22. Raymond has 7 baseball caps, 2 jackets, 10 pairs of jeans, and 2 pairs of sneakers. How many combinations of the 4 items can he make?
23. In summer camp, Tyrone can choose from 4 outdoor activities, 3 indoor activities, and 3 water sports. He has to choose one of each. How many combinations of activities can he choose?

24. The buffet line offers 5 kinds of meat, 3 different salads, a choice of 4 desserts, and 5 different drinks. If you choose one food from each category, from how many combinations would you have to choose?

Draw a tree diagram to describe the possible outcomes of flipping a coin, then rolling a fair number cube, and spinning a spinner with the number 1-5 on the spinner.

Using your tree diagram find the following probabilities:

26. P(heads, 5 on the number cube, and 3 on the spinner)  

27. P(combination will end with 4 on the spinner)  

28. P(3 on the number cube and 6 on the spinner)  

29. P( heads and all even numbers)  

30. P(combination will end with an odd number)