

### Mixed Review Worksheet

**Answer each of the following questions based on using probability, counting principle, permutations, or combinations. Show all work necessary to support your answers. Round all probabilities to three decimal places.**

1. How many numbers of 3 different digits and less than 500 can be formed from the integers 3, 4, 5, and 9 if the digits must be different? How many if the digits can be repeated?

2. In how many ways can 5 boys and 4 girls be seated in a row containing 9 seats if:  
a) the students can sit anywhere    b) the genders must alternate    c) students of the same gender must sit together

3. From a team of 12 pee-wee basketball players (who play no specific position yet), in how many different ways can the starting lineup of 5 players be announced?

4. From 25 boys and 10 girls, how many committees can be chosen consisting of 2 boys and 1 girl? Is the answer the same for 1 boy and 2 girls? If not, what is it?

5. From a group of 20 sophomores and 10 freshmen, what is the probability of choosing a committee of 4 sophomores and 3 freshmen?

6. In how many ways can a committee of 4 people be chosen from a group of 16?

7. Suppose a code is formed beginning with 2 letters followed by 3 digits. If the first letter must be a vowel, and the first digit must be less than 4, how many codes can be formed if letters and digits can be repeated? What is the probability that the code begins with an E given the above requirements?

8. John selects 5 cards at random all at once from a standard deck, find the probability he will have 3 aces and 2 other cards.

9. What is the probability of rolling a sum of 7 and then a sum of 11 on two consecutive rolls of a pair of dice?

10. If 3 angles are selected at the same time from the following set of angles:  $\{20^\circ, 40^\circ, 60^\circ, 80^\circ, 90^\circ, 110^\circ, 120^\circ\}$ , find the probability that 2 are acute and 1 is obtuse.

11. If Abby, Bruno, Chris, Doreen, and Eeyore are lined up in a row, what is the probability that Abby and Bruno are next to each other?

12. What is the probability of being dealt a flush in a 5-card poker hand? (A flush is a hand in which all cards are members of the same suit).

13. If 3 marbles are drawn at once from a bag containing 2 red marbles, 3 blue marbles, and 4 white marbles, what is the probability 1 of each color is drawn?

14. Suppose you select 3 marbles one at a time from the bag in #13. What is the probability that you select a red marble followed by a blue followed by another red if marbles are not replaced? What is the probability that you make the same selections as above if marbles are replaced after they are drawn?

15. Suppose you roll two dice and toss a coin twice. Find the probability that you roll a sum less than or equal to 10 and get two heads on the coin.

For the following diagram, set up a tree diagram. Be sure to include probabilities on each branch as well as path probabilities at the end of each path.

16. Suppose an athletic team is playing an upcoming three game series. Based on the history of their rivalries, they have a 60% chance of winning their first game, an 75% chance of winning their second, and a 40% chance of winning the third game.  
a) Find the probability that they win all three games.    b) Find the probability that they win at most 1 game.  
c) Find the probability that they win at least one game.