Counting/Probability Unit
Counting Methods Handout – Use after 11.3

Decide whether each of the following is a permutation, combination or a counting principle problem. Do not do the actual computation with the formula, but write how you would solve the problem.
For example: \(10P_3\)

1. Four identical prizes are being given to four lucky people. These four winners will be chosen from 12 contestants. How many ways can the prizes be awarded?

2. License plates are made using 3 letters followed by 3 digits. How many plates can be made if repetition of letters and digits is allowed?

3. From the class of 15 students, a President, Vice President, and Treasurer are to be elected. How many different slates of officers are possible, if no one may hold more than one office?

4. A delegation of 5 students must be chosen from a college to attend a convention. How many different delegations can be chosen if there are 10 eligible students?

5. Seven runners compete in a race for which there will be first and second prizes. In how many ways may the prizes be won?

6. License plates are made using 4 digits followed by 2 letters. How many plates can be made if repetition of both letters and digits is allowed, and the first digit cannot be zero?

7. If you flip a coin 5 times, how many total outcomes are there?

8. A city soccer league has 7 teams. In how many possible ways could the league assign the first and second place trophies at the end of the season?

9. The Math Club at TCC is made up of 53 people – 22 males and 31 females. Suppose the club elects officers for President, Vice President, Secretary, and Treasurer. Find the number of ways to select the officers, if each must be a male.

10. A box contains 3 red balls, 4 white balls, 2 yellow balls, and 1 green ball. In how many ways can you randomly select 3 white balls and 1 red ball?

11. Six high school seniors are to be selected from a group of thirty high school seniors. Each of the six will receive a free ticket to Grad Night at Walt Disney World. How many ways can the selection be made?

12. Ten people volunteer to work in a brain bowl competition. Only four are needed to work. One would act as moderator, one would keep score, one would keep time, and one would be a runner. Assuming all ten people could perform all the tasks, how many ways could the assignments be made?

13. Mrs. Brown is giving a bridal shower for a friend. Due to her hectic schedule, she decides to hire a caterer. The caterer offers 10 appetizers and 12 desserts. Mrs. Brown decides to choose 3 appetizers and 2 desserts. How many ways can these selections be made?

14. How many ways can seven children line up for lunch?

Answers: 1. 12C_4 2. Counting Principle (CP) \(-26\cdot26\cdot26\cdot10\cdot10\) 3. 15P_3 or CP 4. 10C_5
5. 7P_3 or CP 6. CP - 9 \cdot 10 \cdot 10 \cdot 10 \cdot 26 \cdot 26
7. CP - 2^5 8. 7P_2 9. 22P_4 10. 4C_3 \cdot 3C_1
11. 30C_6 12. 10P_4 13. 10C_3 \cdot 12C_2 14. 7P_7 or CP