1. Dr. I. N. Stein has 24 students in a physics class. Over the course of the year, Dr. Stein would like to arrange the lab groups so that every student has the opportunity to work with every other student in groups of two. How many different two-person lab groups are there? 

2. In North America, a euchre hand consists of five cards from a deck of 24 different cards. How many different euchre hands are there? 

3. A coffee shop offers six different coffee blends, four creamer options (including black), and seven syrup flavor options (including none). How many different coffee combinations are there? 

4. A pizza parlor has 8 vegetarian toppings and 6 non-vegetarian toppings. How many different pizzas can be made with two vegetarian and two non-vegetarian toppings? 

5. Each state sends 3 members to the Serendipity Club national convention. The club selects 5 members randomly from the convention to be its board for the coming year. What is the probability that all 3 delegates from your state will be on the board next year? 

6. Refer to Question 2. Half the cards in a euchre deck are red. What is the probability of being dealt a euchre hand with only red cards? 

In 7 and 8, a box contains 13 red, 7 green, and 17 white balls. Three balls are drawn at random without replacement.

7. Determine the probability that all three are white.

8. Determine the probability that 1 of each color is drawn.

In 9 and 10, five cards are drawn from a well-shuffled deck of 52 cards. Each deck contains four each of aces, Kings, Queens, Jacks, 10s, 9s, 8s, 7s, 6s, 5s, 4s, 3s, and 2s.

9. Find the probability that three of the five are Jacks.

10. Find the probability that two are 10s, two are 7s and one is a King.