example, a phase I test of bexarotene involved only 14 subjects. Assume that we want to treat 14 healthy humans with this new drug and we have 16 suitable volunteers available.

a. If the subjects are selected and treated *in sequence*, so that the trial is discontinued if anyone displays adverse effects, how many different sequential arrangements are possible if 14 people are selected from the 16 that are available?

b. If 14 subjects are selected from the 16 that are available, and the 14 selected subjects are all treated at the same time, how many different treatment groups are possible?

c. If 14 subjects are randomly selected and treated at the same time, what is the probability of selecting the 14 youngest subjects?

23. Combination Lock The typical combination lock uses three numbers between 0 and 49, and they must be selected in the correct sequence. How many different "combinations" are possible? Which of the five rules of this section is used to find that number? Is the name of "combination lock" appropriate? If not, what other name would be better?

24. Safety with Numbers The author owns a safe in which he stores all of his great ideas for the next edition of this book. The safe "combination" consists of four numbers between 0 and 99, and the safe is designed so that numbers can be repeated. If another author breaks in and tries to steal these ideas, what is the probability that he or she will get the correct combination on the first attempt? Assume that the numbers are randomly selected. Given the number of possibilities, does it seem feasible to try opening the safe by making random guesses for the combination?

25. Jumble Puzzle Many newspapers carry "Jumble," a puzzle in which the reader must unscramble letters to form words. The letters MYAIT were included in newspapers on the day this exercise was written. How many ways can those letters be arranged? Identify the correct unscrambling; then determine the probability of getting that result by randomly selecting one arrangement of the given letters.

26. Jumble Puzzle Repeat the preceding exercise using these letters: RAWHOR.

27. Counting with Fingers How many different ways can you touch two or more fingers to each other on one hand?

28. Identity Theft with Credit Cards Credit card numbers typically have 16 digits, but not all of them are random. Answer the following and express probabilities as fractions.

a. What is the probability of randomly generating 16 digits and getting *your* MasterCard number?

b. Receipts often show the last four digits of a credit card number. If those last four digits are known, what is the probability of randomly generating the other digits of your MasterCard number?

c. Discover cards begin with the digits 6011. If you also know the last four digits of a Discover card, what is the probability of randomly generating the other digits and getting all of them correct? Is this something to worry about?

29. Electricity When testing for current in a cable with five color-coded wires, the author used a meter to test two wires at a time. How many different tests are required for every possible pairing of two wires?

30. ATM You want to obtain cash by using an ATM machine, but it's dark and you can't see your card when you insert it. The card must be inserted with the front side up and the printing configured so that the beginning of your name enters first.

a. What is the probability of selecting a random position and inserting the card with the result that the card is inserted correctly?