1. The school board has seven members.
a) The board must have three officers: a president, vice-president, and secretary. How many different sets of these officers can be formed from this board?

b) How many three-person committees can be formed from this board?

c) Is part (a) asking for a number of permutations or combinations? What about part (b)?

d) How are the answers to part (a) and (b) related?

2. Ralph Simpson has room for three plants on a windowsill.
a) In how many different ways can three plants be arranged on his windowsill?

b) Was (a) a permutation or combination? Explain.

c) Suppose Ralph has six plants. How many groups of three plants can be put on his windowsill?

d) Was (c) a permutation or combination? Explain.

e) Suppose Ralph has nine plants. How many ways can three of these plants be arranged on his windowsill?

f) Was (e) a permutation or combination? Explain.

3. To open your locker, you must dial a sequence of three numbers, in a specific order, to open the lock. Is this a permutation or a combination? Explain.

4. Suppose fifteen people quality for a cheerleading squad, six men and nine women.
a) How many six-member squads can be selected?

b) Suppose that exactly two members of the six-member squad must be male. How many six-member squads can be selected?

5. Ten band directors at a summer camp are planning to give a performance. One of the pieces they want to play calls for a flute, an oboe, a clarinet, and a violin. Each of the band directors can play all four instruments. How many different quartets can they have?

6. You have a new CD playing in your car that contains 13 songs on it. If you hit 'random play' to play the songs in a random order, how many different ways can the songs play?

In Exercises 7–12, classify the statement as an example of classical probability, empirical probability, or subjective probability.

7. On the basis of prior counts, a quality control officer says there is a 0.05 probability that a randomly chosen part is defective.

8. The probability of randomly selecting five cards of the same suit (a flush) from a standard deck is about 0.0005.

9. The chance that Corporation A's stock price will fall today is 75%.

10. The probability of a person from the United States being left-handed is 11%.

11. The probability of rolling 2 six-sided dice and getting a sum greater than nine is $\frac{1}{6}$.

12. The chance that a randomly selected person in the United States is between 15 and 24 years old is about 14%. *(Source: U.S. Census Bureau)*

3. Expand using the Binomial Theorem + Pascal's △. $(2x - 3)^4$