Discuss with your partner(s)

1. A combination padlock requires selecting three numbers from 0 through 39.
   (a) How many different combinations are there?
   (b) No number may be used twice, how many combinations are there?

2. Wheaton is adjusting the registration PINs to be a sequence of four symbols chosen from the 26 letters in the alphabet and the digits 1–9.
   (a) If repetition is allowed, how many PINS are available?
   (b) If repetition is not allowed, how many PINs are available?
   (c) Repeat (a) and (b) if a PIN must begin with a letter.

3. (a) How many integers are there from 1000 through 9999?
   (b) How many odd integers are there from 1000 through 9999?
   (c) How many integers from 1000 through 9999 have distinct digits?
   (d) How many odd integers from 1000 through 9999 have distinct digits?
   (e) What is the probability that a randomly chosen four-digit integer has distinct digits? has distinct digits and is odd?

Epp, Exercise 9.2.17

Discuss with your partner(s)

4. Joel and Ellie are playing a best three out of five rock-paper-scissors tournament. How many ways can the tournament be completed where no one wins three in a row?

5. If A and B are finite sets, explain why the following is true:

$$|A \cup B| = |A| + |B| - |A \cap B|$$

6. If $A, B,$ and C are finite sets, create a formula similar to the one above for $|A \cup B \cup C|$

7. Suppose you're on a game show, and you're given the choice of three doors:

    Behind one door is a car; behind each of the others is a goat.

   You pick a door, say No. 1, and the host, who knows what's behind the doors, opens another door, say No. 3, which has a goat.
   He then says to you, "Do you want to pick door No. 2?"
   Is it to your advantage to switch your choice (assuming you'd prefer the car)?