Probability and Counting Exercises

1. You have 10 songs in your mp3 player. You have a shuffle feature that will play songs in random order. The shuffle function will play each song once before it starts repeating.

   (a) Suppose you listen to the 10 songs in a random order. What is the probability that you hear the songs in alphabetical order, with artist names toward the beginning of the alphabet first?

   (b) Suppose you listen to the 10 songs in a random order. What is the probability that you hear the songs in chronological order, with older songs being played first?

   (c) Suppose you only have time to listen to three random songs. How many different three-song sequences are there?

   (d) Now suppose that you don't care about the order of the songs. How many different three-song sets are there?

   (e) Suppose of the 10 songs, 3 are by Prince. If you listen to just 3 songs using the shuffle function, what is the probability that you hear all the Prince songs?

2. You have a pile of 12 books which contains a four-volume set of math books, and 8 assorted novels. If you put the books at random on a shelf, what is the probability that the four-volume set will be in order and adjacent to each other?

3. Suppose there are three trustees and two students who are going to sit together at a table. How many ways can the five people be seated?

4. Suppose that the students want to sit together and the trustees want to sit together. How many different ways can this be accomplished?

5. Suppose the students and trustees are seated at random. What is the probability that the students and the trustees are sitting together?