

Combinatorics Ordering and Repetitions Problems

Sunday, 11/8/09

1. There is a bookcase with three different books: a math book, an English book, and a history book.
 - (a) Can you list all the possible orders of the books on the shelf?
 - (b) How many ways are there total?
 - (c) What if the books are instead stacked with the bindings face up, and on a spinning tray (this means that you can rotate the tray to make one order the same as another order. For example, M-E-H is the same as H-E-M. And E-M-H is the same as H-M-E). How many ways are there to order them, total?
2. There is a race to become the best mathematician in the universe. There are five people in the race, and five possible places (1st, 2nd, 3rd, 4th and 5th).
 - (a) Assuming every person gets a place in the race, how many different outcomes are possible?
 - (b) How many different combinations are there for just 1st and 2nd place (3rd, 4th and 5th do not matter)?
 - (c) How many different combinations are there for just 2nd, 4th, and 5th place (1st and 3rd do not matter)?
3. How many ways are there to pick 2 cards from the following four cards: Ace of Hearts, Ace of Diamonds, Ace of Clubs, Ace of Spades? Does the order matter?
4. How many ways are there to choose a 5-person basketball team from a group of 8 people?
5. *How many ways are there to pick 4 cards from the following ten cards: Two of Spades, Two of Spades, Two of Spades, Ace of Hearts, Ace of Hearts, Queen of Diamonds, Queen of Diamonds, King of Clubs, Seven of Clubs, Jack of Spades.