CEE 110

Discussion Week 4

33. Consider a Little League team that has 15 players on its roster.

- **a.** How many ways are there to select 9 players for the starting lineup?
- **b.** How many ways are there to select 9 players for the starting lineup and a batting order for the 9 starters?
- **c.** Suppose 5 of the 15 players are left-handed. How many ways are there to select 3 left-handed outfielders and have all 6 other positions occupied by right-handed players?

35. A production facility employs 10 workers on the day shift, 8 workers on the swing shift, and 6 workers on the graveyard shift. A quality control consultant is to select 5 of these workers for in-depth interviews. Suppose the selection is made in such a way that any particular group of 5 workers has the same chance of being selected as does any other group (drawing 5 slips without replacement from among 24).

- **a.** How many selections results in all 5 workers coming from the day shift? What if the probability that all 5 selected workers will be from the day shift?
- **b.** What is the probability that all 5 selected workers will be from the same shift?
- **c.** What is the probability that at least two different shifts will be represented among the selected workers?
- **d.** What is the probability that at least one of the shifts will be unrepresented in the sample of workers?

45. The population of a particular country consists of three ethnic groups. Each individual belongs to one of the four major blood groups. The accompanying Joint probability table gives the proportions of individuals in the various ethnic group-blood group combinations

		Blood group			
		O	**A**	**B**	**AB**
Ethnic Group	**1**	.082	.106	.008	.004
	2	.135	.141	.018	.006
	3	.215	.200	.065	.020

Suppose that an individual is randomly selected from the population, and define events by A = {type A selected}, B = {type B selected}, and C = {ethnic group 3 selected}.

- **a.** Calculate P(A), P(C), and P(A $\cap$ C).
- **b.** Calculate both P(A|C) and P(C|A), and explain in context what each of these probabilities represents.
- **c.** If the selected individual does not have type B blood, what is the probability that he or she is from ethnic group 1?

51. According to a July 31, 2013, posting on cnn.com subsequent to the death of a child who bit into a peanut, a 2010 study in the journal Pediatrics found that 8% of children younger than 18 in the United States have at least one food allergy. Among those with food allergies, about 39% had a history of seven reaction.

- **a.** If a child younger than 18 is randomly selected, what is the probabilities that he or she has at least one food allergy and a history of seven reaction.
- **b.** It was also reported that 30% of those with an allergy in fact are allergic to multiple foods. If a child younger than 18 is randomly selected, what is the probability that he or she is allergic to multiple foods?