No books, no calculators.

Name: ____________________________

Student ID:_______________________
1. 15 pts. Five boys and four girls are arranged in a row with all arrangements equally likely. What is the probability that every girl sits next to at least one other girl?
2. 15 pts. How many arrangements of the letters in BOOKKEEPING are there where the Ks are not consecutive (not next to each other), but the Es are consecutive (next to each other)?
3. 10 pts. How many ways are there to distribute identical 15 donuts to 10 people so that everyone gets at least one donut and the first two people get the same number of donuts?
4. 10 pts. What is the probability of dealing a five-card poker hand that has:

(a) A straight (a set of five consecutive values, not necessarily of the same suit: A2345, 23456, ..., 9TJQK, TJQKA)

(b) No pairs (although possibly a straight or flush)
5. 10 pts. A man is dealt 3 diamond cards from an ordinary deck of 52 cards. If he is given 4 more, what is the probability that none of them are diamonds?
6. 15 pts. In a group of 100 students, 33 were taking a language class, 28 a science class, and 29 a math class. Furthermore, 13 were taking both a language and math class, 14 were taking both a language and science class, and 15 were taking both a math and a science class. Finally, only 5 were taking a language, a science, and a math class. How many were taking none of the three types of classes?
7. **15 pts.** How many ways are there to assign each of five professors in a math department to two courses in the fall semester (i.e., 10 different math courses in all) and then assign each professor two courses in the spring semester such that no professor teaches the same two courses both semesters?