Analysis H
Chapter 1 Review – Discrete Math

1. In how many ways can 6 shuttle vans line up at the airport?

2. How many ways can 5 people be selected from 12 for a committee?

3. How many ways can you arrange a tray of cookies with 6 chocolate chip, 3 sugar, and 5 oatmeal raisin?

4. When you order a salad at Healthy Boy Café, you start with ordering a base of romaine, spinach, or spring mix. They then have 18 different toppings that you can elect to have on top of your salad. Strangely, the only dressing they offer is ranch. And you have to take it. How many different ways can you order a salad from Healthy Boy?

5. A bag of marbles contains 5 blue and 7 green marbles. If I reach into the bag and grab 6 marbles at random, what is the probability that my group will contain exactly 2 blue marbles?

6. A group of 50 students meet at a school function. 35 of the students are econ majors, and 27 of the students are accounting majors. 12 of them are neither econ nor accounting. How many are majoring in both?

7. In a certain area, 15% of the population likes to jog, and 40% of the joggers are women. 55% of those who do not jog are women. If a woman is selected at random from the community, find the probability that she is not a jogger.

8. A box contains 8 good light bulbs and 3 bad ones. I select bulbs out of the box (without replacement) until I find one that works. Find the probability that I remove exactly 4 bulbs.

9. P(E) = 0.4, P(F) = 0.5, and P(E or F) = 0.8. Find P(F | E).

10. a) 2 cards are drawn (without replacement) from a standard deck of 52. What is the probability that both are spades, given that the first one drawn is a spade?

b) What is the probability that both are spades, given the one of them is a spade?

11. 20% of the employees of Acme Steel Company are college graduates. Of all its non-grad employees, 25% earn more than $50,000/year, while 15% of the graduate employees earn more than $50,000 per year. Selecting a person at random, what is P(earns >$50k | is a college grad)?

12. Each of 3 jars contains 2 marbles. Jar A contains a Blue and a Green marble. Jar B contains 2 Blue marbles. Jar C contains 2 Green marbles. A jar is selected at random, and a single marble removed. If it is a Blue marble, what is the probability that the other marble in the jar is Blue?

13. There are 5 boys and 9 girls in a classroom. If they are randomly assigned numbers and then told to stand in numerical order, what is the probability that all the boys will be standing next to each other?

14. In the classroom from #13, we randomly select 5 students. What is the probability that there will be at least one male in the group?

15. On a cruise ship of 600 passengers, 4 people have contracted a tropical disease. Suppose that, in order to discover whether the disease is present on the ship, the Public Health Service randomly selects 20 people to be screened for the disease. What is the probability that the disease will escape detection?

16. What is the 4^{th} term in the expansion $(x - 2y)^7$?

17. The recovery rate for a certain cattle disease is 25%. If 40 cattle are afflicted with the disease, what is the probability that exactly 13 cattle will recover?

18. For #17, what is the expected number of cattle to recover?

19. A single die is rolled 10 times, and the number of sixes is observed. What is the probability that a six appears 9 times, given that it appears at least 9 times?

20. A local symphony decides to raise money by raffling off a microwave oven worth $400, a dinner gift certificate worth $80, and a DVD box set worth $40. A total of 2000 tickets are sold at $1 each. Find the expected value of a single raffle ticket.

21. A coin is tossed 3 times, and the number of heads is recorded. Find the probability distribution for the number of heads.