Instructions: Answer all questions given below. You will complete this assignment and turn in a physical copy during class on due date. You must **show all of your work** for all problems (including multiple choice questions) in order to receive full credit.

1. A businesswoman in Philadelphia is preparing an itinerary for a visit to six major cities. The distance traveled, and hence the cost of the trip, will depend on the order in which she plans her route. [She will only visit each city one time.]
   1. How many different itineraries are possible?
   2. Denver and San Francisco are two of the cities that she plans to visit. If the businesswoman randomly selects one of the possible itineraries, what is the probability that she will visit Denver before San Francisco?
2. A student prepares for an exam by studying a list of ten problems. She can solve six of them. For the exam, the instructor selects five problems at random from the ten on the list given to the students. What is the probability that the student can solve all five problems on the exam?
3. Consider an experiment that consists of recording the birthday for each of 12 randomly selected persons. Ignoring leap years and assuming that there are only 365 possible distinct birthdays, find the number of outcomes in the sample space *S* for this experiment. If we assume that each of the possible sets of birthdays is equally likely, what is the probability that each person had a different birthday?
4. [Multiple Choice] A labor dispute has arisen concerning the distribution of 10 laborers to four different construction jobs. The first job (considered to be very undesirable) required 3 laborers; the second, third, and fourth utilized 2, 2, and 3 laborers, respectively. The dispute arose because jobs were to be assigned randomly, but the alleged random assignment resulted in all 3 members of a particular ethnic group being assigned to job 1. In considering whether this represented an injustice, a mediation panel considered the probability of this observed outcome.

Compute the probability of the observed event (all 3 members of a particular ethnic group being assigned to job 1) if it is assumed that the laborers were randomly assigned to jobs.

1. 0.002
2. 0.008
3. 0.013
4. 0.025
5. 0.050
6. [Multiple Choice] A group of 15 friends wants to play “seven versus seven” flag football. How many different match-ups are possible?
7. 15
8. 6435
9. 10,080
10. 25,740
11. 51,480
12. [Multiple Choice] Thirty items are arranged in a 5-by-6 array as shown below. Calculate the number of ways to form a set of three distinct items such that no two of the selected items are in the same row or same column.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A1 | A2 | A3 | A4 | A5 | A6 |
| A7 | A8 | A9 | A10 | A11 | A12 |
| A13 | A14 | A15 | A16 | A17 | A18 |
| A19 | A20 | A21 | A22 | A23 | A24 |
| A25 | A26 | A27 | A28 | A29 | A30 |

1. 1200
2. 2000
3. 4060
4. 6000
5. 7200

1. See the Poker Hands in-class activity.
   1. Do you think the probability of being dealt a “straight” or being dealt a “flush” is higher in a game of poker? [Not considering straight flushes!] Explain your thought process, and then check by computing the probability for each.
   2. What would be your strategy for computing the probability of not being dealt any of the poker hands? [This is also referred to as a “High Card” hand.] No computations necessary! Just explain what you think the correct approach would be.
2. An upscale restaurant offers a special *fixe prix* menu in which, for a fixed dinner cost, a diner can select from four appetizers, three salads, four entrees, and five desserts. How many different dinners are available if a dinner consists of one appetizer, one salad, one entrée, and one dessert?
3. A fleet of nine taxis is to be dispatched to three airports in such a way that three go to airport A, five go to airport B, and one goes to airport C.
   1. In how many distinct ways can this be accomplished?
   2. Exactly one of the taxis is in need of repair. What is the probability that it is dispatched to airport C?

* 1. If three of the taxis were in need of repair, what is the probability that every airport would receive one of the taxis requiring repairs?

1. Students attending the University of Florida can select from 130 major areas of study. A student’s major is identified in the registrar’s records with a two-or three-letter code (for example, statistics majors are identified by STA, math majors by MS). Some students opt for a double major and complete the requirements for both of the major areas before graduation. The registrar was asked to consider assigning these double majors a distinct two- or three-letter code so that they could be identified through the student records’ system.

* 1. If any two- or three-letter code is available to identify majors or double majors, how many major codes are available?
  2. Are there enough major codes available to identify all single and double majors at the University of Florida? Explain your answer. How many single and double majors codes are needed?

1. Five firms, *F*1, *F*2, . . . , *F*5, each offer bids on three separate contracts, *C*1, *C*2, and *C*3. The contracts are quite different, and any one firm will be awarded at most one contract.
   1. How many outcomes are possible in this experiment involving assignment of contracts to the firms?
   2. Under the assumption of equally likely outcomes, find the probability that *F*3 is awarded a contract.
2. See the Powerball in-class activity. What outcomes result in someone not winning a prize? Compute the probability for each of these outcomes and then the overall probability of not winning a prize when playing Powerball.