

Math 101
Exam 4
Fall 2010

Name:

1. [10 pts.] One card is selected from a deck of playing cards. Find the probability of selecting a king or a club.
2. [10 pts. each] Two cards are selected at random. Find the probability the first shows a 2 and the second shows a queen
 - (a) with replacement.
 - (b) without replacement.
3. [10 pts.] Each question of a six-question multiple-choice exam has four possible answers. Oliver Windybum picks an answer at random for each question. Determine the probability that he selects the correct answer on only the third and fourth questions.
4. [10 pts. each] Use the following data concerning the age distribution of Ziltoidian citizens, which are rounded to the nearest million.

Age	Male	Female	Total
0-14	41	30	71
15-64	99	75	174
65 or over	21	15	36
Total	161	120	281

If an individual is selected at random, find the probability that the person is

- (a) 15-64 years old, given that the person is female.
 - (b) Male, given that the person is 65 or over.
 - (c) 0-14 or over 65, given that the person is male.
5. [10 pts. each] Assume that a password to log onto a computer account is to consist of three letters followed by two digits. Determine the number of possible passwords if
 - (a) repetition is not permitted.
 - (b) repetition is permitted.
 6. [10 pts.] A bank has three drive-through stations. Assuming that each is equally likely to be selected by customers, in how many different ways can the next six drivers select a station? (It helps to assume customers arrive only one at a time.)
 7. [10 pts.] Determine the number of permutations of the letters of the word MISSISSIPPI.
 8. [10 pts.] Mary Crumbcake bought a package of 24 different plants, but she only needed 20 plants for planting. In how many ways can she select the 20 plants from the package to be planted?

9. [10 pts.] A sadistic teacher is constructing a math test consisting of 12 questions. She has a pool of 38 questions, which are classified by level of difficulty as follows: 18 are hard questions, 12 are average, and the rest are easy. How many different 12-question tests can she cook up from the pool of 38 questions if her test is to have 6 hard, 4 average, and 2 easy questions?
10. [10 pts.] The numbers 0 through 9 are put in a hat on separate slips of paper. If three slips are selected at random, what is the probability that the three numbers selected are greater than 4?
11. [10 pts.] A game show has seven doors, of which the contestant must pick two. Behind two doors are awesome cars, and behind the other five doors are “pre-owned” undergarments. A contestant wins whatever is behind the two doors he or she selects. Determine the probability that the contestant wins
 - (a) both cars.
 - (b) at least one car.
12. [10 pts.] A pair of aces and a pair of 8’s is known as a “dead man’s hand.” Determine the probability of being dealt a dead man’s hand (any two aces, any two 8’s, and one other card that is not an ace or an 8) when 5 cards are dealt without replacement.
13. [10 pts.] A quality control engineer at the Illuminati lightbulb plant finds that 1% of its bulbs are defective. Determine the probability that exactly 2 of the next 8 bulbs made are defective.
14. [10 pts. each] Mortimer McDoogalhauser has to take a ten question multiple-choice quiz in his elementary stage lighting class. (It’s important to know when to shine a light in Captain Kirk’s eyes when he begins a rousing speech about how “Men must have challenges to be happy.”) Each question has four choices for answers, of which only one is correct. Assuming that Mr. McDoogalhauser guesses on all ten questions on account of being too hung over from last night’s carousing about town and engaging in fisticuffs over the finer points of stage lighting theory with a biker gang, find the probability that he will answer
 - (a) exactly half the questions correctly.
 - (b) at least nine questions correctly.
 - (c) at least one question correctly. (Hint: what’s the “complementary” event?)