HW 2

STAT 544, Fall 2015

Each homework assignment will be worth 20 points, and your best 10 of 12 assignment scores will be averaged to determine the homework contribution to your overall course average.

Note: Five of the of the eight parts below will be graded, with each graded part worth 4 points. (I won't specify which parts will be graded until after the papers have been submitted.)

1) Suppose that 3 men get on an elevator on the 7th floor of a 7 story building, and each will roll an ordinary six-sided fair die to choose a floor at which to get off.

(a) What is the probability that at least two will get off at the same floor?

(b) What is the probability that the elevator will stop at three consecutive floors (e.g., 5th, 4th, and 3rd)?

2) Suppose that an urn contains 30 objects, each of which is either a ball or a cube, and each of which is either amber or green.

 $19 \ {\rm of} \ {\rm the} \ 30 \ {\rm objects} \ {\rm are} \ {\rm balls}.$

10 of the 30 objects are amber. (Some of these are balls, and some are cubes.)

8 of the 30 objects are green cubes.

If one of the objects will be randomly selected, what is the probability that it will be an amber ball?

3) If the six people of three married couples (each consisting of a man and a woman) will be lined up from left to right, what is the probability that at least one man will be placed next to his wife?

4) If A and B are events for which

P(A) = 1/2, P(B|A) = 1/3, &P(A|B) = 1/4,

what is the value of P(B)?

5) Consider two six-sided dice, one blue and one green, for which the outcomes 1, 2, 3, 4, 5, and 6 are equally likely. When these dice are rolled, what is the probability that the sum of their outcomes will be 7 or larger, given that the outcome of the blue die is 4 or smaller?

6) Consider three six-sided dice, one amber, one blue, and one green, for which the outcomes 1, 2, 3, 4, 5, and 6 are equally likely. When these dice are rolled, what is the probability that the sum of the outcomes of the amber and blue dice will be equal to the outcome of the green die? (*Note*: You can use facts like the probability that the sum of the outcomes of the amber and blue dice will equal 4 is 3/36 without providing explanation.)

7) Suppose that a woman is pregnant with twin boys. Twins may be either identical or fraternal (nonidentical). Suppose that when a woman becomes pregnant with twins, the probability that they are identical is 1/3, and the probability that they are fraternal is 2/3. Identical twins must be the same sex, and suppose that the probability that they are both boys is 1/2, and the probability that they are both girls is 1/2. Fraternal twins may or may not be the same sex. Suppose that with fraternal twins, each one is independently a boy with probability 1/2 and a girl with probability 1/2. Given all of this information, what is your assessment of the probability that the woman's twins are identical twins?