

FINITE MATH, FALL 2016 - PROBLEM SET 6

Name: _____

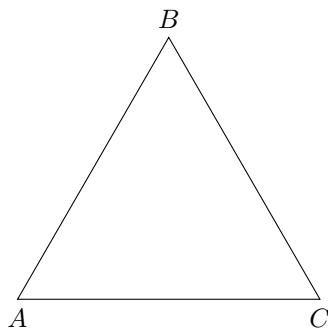
Use this worksheet as the cover sheet for your write-up: write your name on this page, and staple this sheet to the front of your homework packet.

You will receive no credit for submitting solutions that the grader cannot read and understand—be sure to write legibly!

Problem 1. In flipping a coin 23 times, what is the probability of getting all heads or all tails?

Problem 2. In tossing four fair dice, what is the probability of getting at least one 3?

Problem 3. Three ants are sitting on the vertices of a triangle, point A,B,C. Each of the ants can only walk along the edges of the triangle. They can only go left or right. Once they have picked a direction, they keep walking along that direction.



What's the probability that any two ants will collide?

Problem 4. In a study conducted three years ago, 82% of the people in a randomly selected sample were found to have "good" financial credit, while the remaining 18% were found to have "bad" financial credit. Current records of the people show that 30% of those with bad credit rating have since improved their ratings to good. While 15% of those with good credit have since changed their ratings to bad. What percentage of people with good credit now had bad 3 years ago?

Problem 5. Suppose that 5% of men and 2% of women working for a corporation make over \$120000 a year. If 30% of the employees of the corporation are women, what percentage of those who make over \$120000 are women?

Problem 6. A judge is 65% sure that a suspect has committed a crime. During the course of the trial, a witness convinces the judge that there is a 85% chance that the criminal is left handed. If 23% of the population is left handed, and the

suspect is also left handed, with this new information, how certain should the judge be of the guilt of the suspect?

Problem 7. The U.S. Postal service is currently using 5-digit zip codes in most areas. How many zip codes are possible if no restrictions are placed on the digits used? How many would be possible if the first number cannot be a 0?

Problem 8. From the problem above, how many zip codes would be possible if we increased the number of zip codes from 5-digits to 10-digits? Again, assume no restrictions?

Problem 9. BONUS

Prove that if A and B are independent events, then A and B' are independent as well.