

# Math 10120 — Spring 2013

Some more practice problems for the final

Instructor: David Galvin

1. Of the 75 students in Math 10120, 45 are women. Once during each lecture, I pick a student at random to ask a question to. There are 41 lectures during the semester. **Use the normal approximation to the binomial** to estimate the probability that during the course of the semester, I pick at least 30 men to ask questions to?
2. When I throw a discus, my average distance is 50 meters, with standard deviation 5. My throw distances are definitely **not** normally distributed, but still, from the information given, you can say things for certain. For example: With 90% probability, my throws will always be between  $50 - a$  meters and  $50 + a$  meters. What is  $a$ ?
3. I want to determine something about the speeds at which cars drive past the pedestrian crossing at the corner of Vaness and Twyckenham. I take measurements of 10 cars, and get the following readings from my speed gun (all measurements in miles per hour):

25, 35, 45, 50, 55, 35, 30, 45, 45, 35.

Find

- (a) the mean of the sample data;
  - (b) the **sample** variance of the sample;
  - (c) the **sample** standard deviation of the data.
4. A confectioner makes two raisin-nut mixtures. A Standard box contains 6oz of peanuts, 1oz of raisins and 4oz of cashews, and sells for \$4.25. A Deluxe box contains 12oz of peanuts, 3oz of raisins and 2oz of cashews, and sells for \$6.55. The confectioner currently has in stock 5400oz of peanuts, 1200oz of raisins, and 2400oz of cashews.
    - (a) Write down the linear programming problem that the confectioner has to solve, to decide how many Standard and how many Deluxe boxes to make, to maximize revenue (assuming he sells all boxes he makes).
    - (b) Show the feasible set on a graph.
    - (c) Find the corners of the feasible set.
    - (d) Solve the linear programming problem.
    - (e) What is the confectioners optimal profit?
    - (f) If the confectioner makes the mix of Standard and Deluxe boxes dictated by the solution to the linear programming problem, what inventory does he have left after he has made all the boxes?