

Stat 252 Winter 2007
Assignment #6

This assignment is due at the beginning of class on Monday, March 5, 2007. You must submit all problems that are marked with an asterisk (*).

1. * Do the following exercises from Wackerly, et al.

- #9.73, page 453
- #9.74 (b), page 453
- #9.75 (a), page 453
- #9.76, page 453
- #9.77 (a), page 454

2. * A biologist is studying an animal population of unknown size. For each of five consecutive days, she sets a (big) trap in the morning. In the evening, she counts how many animals wandered into her trap, before releasing them. She would like to estimate both p , the probability that any particular animal will be trapped in any particular day, and k , the total size of the population.

(a) Let Y_i denote the number of animals trapped on day i . The biologist postulates that Y_1, \dots, Y_n are independent and identically distributed as $\text{Bin}(k, p)$. Comment very briefly on whether or not you think this is reasonable.

(b) Assume that data $y_1 = 13, y_2 = 15, y_3 = 14, y_4 = 9, y_5 = 12$ are observed. Determine the method of moments estimates for k and p .

(c) What if $y_5 = 5$ had been observed, instead of $y_5 = 12$. Recompute your estimates. Do you have any comments?

(Note: This is an uncommon use of the $\text{Bin}(k, p)$ distribution. Experiments where k is known (fixed by the experimenter) and only p is unknown are much more common.)