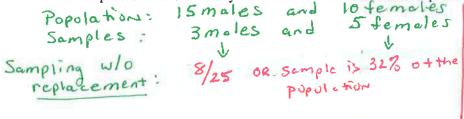
AP Statistics – 6.3C	Name:	
Goal: Understand Sampling without replacement	Date:	

I. Example 1: (page 394)

Hiring Discrimination

Work this problem out and then you should be able to do the next problem on your own.



5 females B = Success = Selected female I: SRS is 32%, and Sampling w/o
replacement

N = # +riels = 8

S = P(s) = 10/25 = 40%

CONCLUSION: THE BINOMIAL DISTRIBUTION ASSUMES INDEPENDENCE. IN THIS CASE WE ARE SAMPLING WITHOUT REPLACEMENT AND THE SAMPLE IS TOO LAZGE AND DOES NOT SATISFY THE 10% CONDITION, THIS EXPLAINS WHY THE BINOMIA
PROBABILITY (.124) IS 50 FAR OFF FROM THE CORRECT PROBABILITY
KAMPILE 2.

11. Example 2:

Dead Batteries

Almost everyone has one—a drawer that holds miscellaneous batteries of all sizes. Suppose that your drawer contains 8 AAA batteries but only 6 of them are good. You need to choose 4 for your graphing calculator. If you randomly select 4 batteries, what is the probability that all 4 of the batteries you choose will work?

Explain why the answer isn't $P(X = 4) = {4 \choose 4} (0.75)^4 (0.25)^6 = 0.3164$. Problem:

The actual probability is 0.2143.

SUCCESS = GOUD BATTERY FAILURE = BAD BATTERY RANDOMLY SELECT 4 OF THE 8 BATTERIES ANOTINDEPENDENT BECAUSE WE ARE SELECTING LESS THAN 10% OF THE POPULATION (in this case 8=N)

FIXED TRIALS May

FIXED PROBABILITY OF SUCCESS P(S)= 1/8=.75

* BECAUSE WE ARE SAMPLING 5000 (4/8) OF THE POPULATION, IT IS NOT REASONABLY TO IGNORE THE LACK OF INDEPENDENCE AND USE THE BINOMIAL DISTRIBUTION. THIS IS WHY THE

Definition: Explain the "10% condition" III.

BINOMIAL PROBABILITY IS SO DIFFERENT FROM THE ACTUAL PROBABILITY

A SAMPLING WITHOUT REPLACEMENT CONDITION MUST MEET THE "10% CONDITION"

* WHEN TAKING AN SRS, WE CAN USE A BINOMIAL DISTRIBUTION AS LONG AS THE SAMPLE IS LESS THAN 10% OF THE PUPULATION.

n 5 To N N= sample N= population

AP Statistics – 6.3C	Name:
Goal: Understand Sampling without replacement	Date:

I. Example 1: (page 394) Hiring Discrimination

Work this problem out and then you should be able to do the next problem on your own.

II. Example 2:

Dead Batteries

Almost everyone has one—a drawer that holds miscellaneous batteries of all sizes. Suppose that your drawer contains 8 AAA batteries but only 6 of them are good. You need to choose 4 for your graphing calculator. If you randomly select 4 batteries, what is the probability that all 4 of the batteries you choose will work?

Problem: Explain why the answer isn't $P(X = 4) = {4 \choose 4} (0.75)^4 (0.25)^0 = 0.3164$.

The actual probability is 0.2143.

Solution:

- Since we are sampling without replacement, the selections of batteries aren't independent. We can ignore this problem if the sample we are selecting is less than 10% of the population.
- However, in this case we are sampling 50% of the population (4/8), so it is not reasonable to ignore the lack of independence and use the binomial distribution.
- This explains why the binomial probability is so different from the actual probability.

III. Definition: Explain the "10% condition"