I-clicker — see next page

~~XX~~ Sampling w/o replacement (hypergeom dist)

⇒ Pop 1000 voters
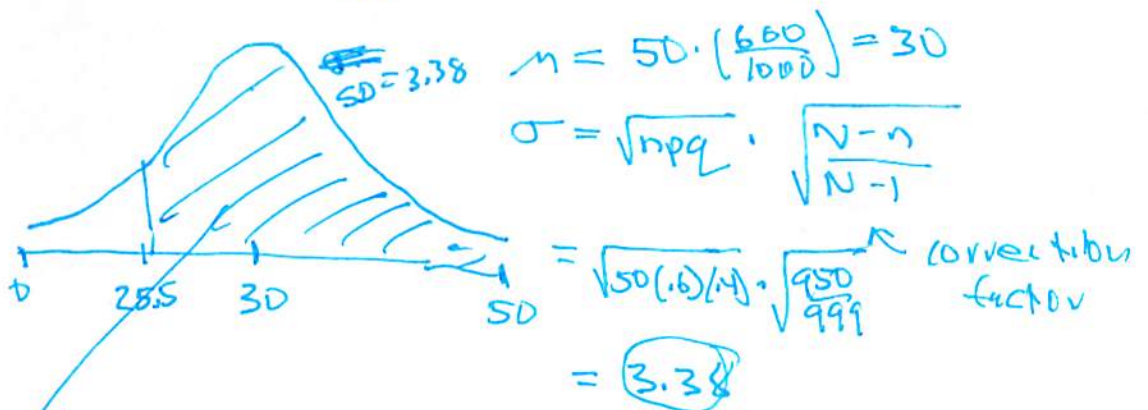In pop, 600 will vote prop 2
SRS of 50 voters

$P\left(\text{majority in sample will vote for prop 2}\right)$

$$= \sum_{K=26}^{50} \frac{\binom{600}{K}\binom{400}{50-K}}{\binom{1000}{50}}$$

Note: Can approx by normal

SD = 3.38 $\mu = 50 \cdot \left(\frac{600}{1000}\right) = 30$

$\frac{6}{N}$

$\sigma = \sqrt{npq} \cdot \sqrt{\frac{N-n}{N-1}}$

$= \sqrt{50(.6)(.4)} \cdot \sqrt{\frac{950}{999}}$ ← correction factor

$= \boxed{3.38}$

$1 - \overline{\Phi}\left(\frac{25.5 - 30}{3.38}\right)$ $\boxed{= .91}$

Stat 134

Chapter 2   Monday February 5 2018

1. The probability of being dealt a three of a
   kind poker hand (ranks aaabc) is:

   a $\dbinom{5}{3}$ $\dfrac{52}{52}\dfrac{3}{51}\dfrac{2}{50}\dfrac{48}{49}\dfrac{44}{48}$

   $\overset{a\ a\ a\ b\ c}{}$

   not $\dbinom{12}{1}\dbinom{11}{1}$ since $aaabc = aaacb$

   b $\dbinom{13}{1}\dbinom{12}{2}\dbinom{4}{3}\dbinom{4}{1}\dbinom{4}{1} / \dbinom{52}{5}$

   $\overset{a}{}\qquad\overset{b}{}\qquad\overset{c}{}$

   (c) more than one of the above

   d none of the above

ex (2016 Prob actuarial exam).

A store has 80 modems

30 coming from source A and the remainder
from source B.
                                        ↙ not seven
Of the modems from source A, 70% defective.
Of the modems from source B, 8% defective.
Calculate the prob that 2 out of a random
sample of 5 modems are defective.

hypergeom since random sample

Good = defective

P (2 defective out of 5)

N, G, n
↑   ↑   ↘
| 5
80

(.2)30 + (.08)50 = 10

$$\frac{\binom{10}{2}\binom{70}{3}}{\binom{80}{5}}$$

ex (2.R.27)

Cal schedules its final exams in 18 groups,
spread over 6 days with 3 examinations each day.
Suppose all students take 4 exams.

Find P(a student has their exams on diff days)

Assume $\binom{18}{4}$ exam groups are equally likely.

Choose

$$\binom{6}{4} \cdot \frac{\binom{3}{1}\binom{3}{1}\binom{3}{1}\binom{3}{1}}{\binom{18}{4}} = .3971$$

D1, D2, D3, P4, D5, D6

slot

$$\frac{18}{18} \cdot \frac{15}{17} \cdot \frac{12}{16} \cdot \frac{9}{15} = .3971$$
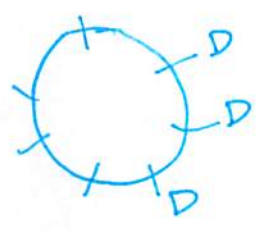
Counting

ex There are 3 Dem, 2 Rep, 2 Indep sitting on a bench.

Find the prob all Dems are sitting together.

D   D   D   nD   nD   nD   nD

$$\frac{3}{7} \cdot \frac{2}{6} \cdot \frac{1}{5} \cdot \frac{4}{4} \cdot \frac{3}{3} \cdot \frac{2}{2} \cdot \frac{1}{1} = \frac{3!\,4!}{7!}$$

$$\Rightarrow \boxed{\frac{5 \cdot 3!\,4!}{7!}}$$

Same but now sitting around a table

$$\boxed{7 \cdot \frac{3!\,4!}{7!}}$$