Section 10.5 Prob Using Perm & Comb

combination

ex 1 HW #1 (similar 2, 3, 4, 5, 7)

A student-faculty government committee of 4 people is to be formed from 17 student volunteers and 5 faculty volunteers. Find the prob that the committee will consist of:

Part 1: All faculty members. Round ans to 5 dec places

$$\text{Prob} = \frac{\#\text{ways to choose 4 from 5 faculty}}{\text{total \#ways to choose 4 from 22}}$$

22 all vols (17 + 5)

$$= \frac{{}_5C_4}{{}_{22}C_4} = 6.835269993E-4$$

E-4 → $\times 10^{-4}$ → move dec to the left 4 places

0.0006835

0.00068 ← Aleks said to round to 5 dec places

mult

Part 2: 2 students and 2 faculty

4 person committee
5 faculty
17 students
} from original problem

$$\text{Prob} = \frac{\#\text{ways to pick 2 stud from 17} \cdot \#\text{ways to pick 2 fac from 5}}{\text{total \# ways to pick 4 people from 22}}$$

$$= \frac{{}_{17}C_2 \cdot {}_5C_2}{{}_{22}C_4}$$

$$= \frac{1360}{7315} = 1360 \div 7315$$

$$= \boxed{0.18592}$$

Part 3: All students

picking 4 stud from 17

$$\frac{{}_{17}C_4}{{}_{22}C_4}$$

Same for each part

$$= \boxed{0.32536}$$

Part 4: 1 faculty and 3 students

$$\frac{{}_5C_1 \cdot {}_{17}C_3}{{}_{22}C_4}$$

$$= \frac{3400}{7315} = \boxed{0.46480}$$

ex 2 HW #6
Find the prob of getting a 5 digit number where all the digits are the same in lotteny game that consists of choosing a 5digit number.

→ repetition is allowed so this is neither a perm nor a combination

Prob = $\frac{\#\text{ways to get a 5 digit \# all same}}{\text{total \# 5 digit \#s}}$

$$= \frac{10}{10 \cdot 10 \cdot 10 \cdot 10 \cdot 10}$$

← all 0, all 1, all 2, all 3, all 4, all 5, ..., all 9

$$= \frac{10}{100{,}000} = 1.E(-4) = .0001 = \boxed{0.0001}$$

← move dec left 4 places

ex3 HW #9 In one lotteny game, contestants pick 5 numbers 1 through 37 and have to match all 5 in any order. What is the prob you will win if you buy 1 ticket?

combination

$$\text{Prob} = \frac{1}{{}_{37}C_5}$$

$= 2.2941 \ldots E-6$

Enter answer as a frac

$$\frac{1}{435,897}$$

ex 4 HW #8

A combination lock has 48 numbers 0-47 and a combination consists of 4 numbers in order with no repeats. Find the prob that the combination consists of only odd numbers.

permutation

48 total #s $\Rightarrow$ { 24 even #s, 24 odd #s

$$\text{Prob} = \frac{\#\text{ways all 4 \#s being odd}}{\text{total \# 4 \#s from all 48}}$$

$$= \frac{{}_{24}P_4}{{}_{48}P_4}$$

$$= \boxed{0.055}$$