Math 530

Q's | 5.1 #17

Probability

$\frac{N(E)}{N(all)}$

P_1, P_2, P_3, P_4

(2x) $P_1, P_3, P_2, \ldots$

runner chain

start 3 chairs (3 - person just before = 2)

17a) $10 \cdot 9 \cdot 8 \cdot 8$

$10 \cdot 9 \cdot 8^{n-1}$

$10 \cdot 9 \cdot 8 \cdot 8 = 10 \cdot 9 \cdot 8^2$

3-1

path is we have 10 people can start the chain and the starter can call one of 9 people and then each call after is 8 possible people

17b) $(9 \times 8 \times 1)/(9 \times 8 \times 8)$

A's starts : 1 call

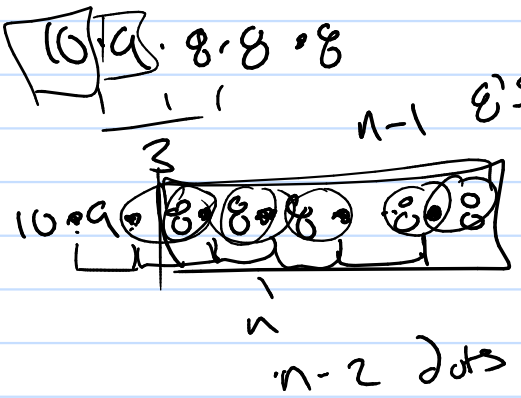
next person : 9 call

next person : 8 call

next pers = A : 1 call

$1 \cdot 9 \cdot 8 \cdot 1 = N(E)$

$N(all)$



$$N(E) = \frac{A \quad A}{|0 \cdot 9 \cdot 8 \cdot 1|}$$

$$N(E) = \frac{}{1 \cdot 9 \cdot 8 \cdot 8}$$

A

17c) $\frac{A}{9 \cdot 8 \cdot 7 \cdot 1}{9 \cdot 9 \cdot 8 \cdot 8}$

B C D A

9 8 7 · 1

all-A all-B (-A) all-C -D -A

5.2 #15 How many n digit ternary $\{0,1,2\}$ sq's with exactly nine 0's are there?

n-string: $S_1 S_2 S_3 \cdots S_n$ $S_i \in \{0,1,2\}$

3 3

ans #1 $C(n,0)\,3^{n-9}$

#2 2^{n-9}

#3 3^{n-9}

#4 $C(n,8)\,2^{n-8}$

$|\text{all n digit ternarys}| = 3^n$

5 digit w/ exactly 3 0's

00012
12000
00021
01020

like this.

$C(n,9)\,2^{n-9}$ -- 000

B B 000

$C(10,9)\,2^{10-9}$ 1000

$3 \cdot 2^2$

$C(5,3)\,2^2$

$C(n,9)$ vs $C(n,0)$ $\{1,2,0\}$

10 digit exactly 9 0's

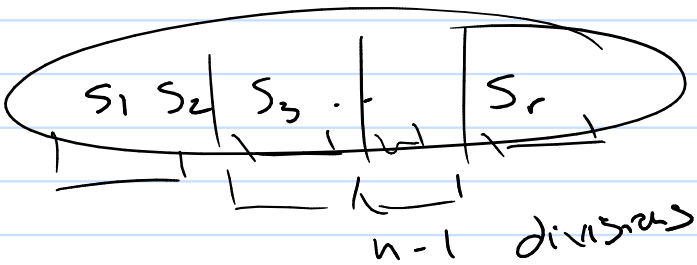
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

$2 \cdot C(10,9) = 2 \cdot \frac{10!}{9!1!} = 2 \cdot 10 = 20$

$C(10,0) = \frac{10!}{8!2!} = \frac{10 \cdot 9}{2} = 45$

5.4 Selection w/ repetition

task: Select r, with repeats, from n-types



task: distribute r identical objects into n boxes

task: $|box\,1| + |box\,2| + \cdots + |box\,n| = r$

$$x_1 + x_2 + \cdots + x_n = r$$

x_i, r are all non-neg.

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all use $C(n+r-1, r)$

task:

	Arrange	Combination
no repetition	$P(n,r)$	$C(n,r)$
unlimited rep.	n^r	$C(n+r-1, r)$

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restricted rep $P(n; r_1, r_2, \ldots r_n) = \dfrac{n!}{r_1! r_2! \cdots r_n!} =$

5.5 Binomial thm

$$(a+b)^n = \sum_{i=0}^{n} \binom{n}{i} a^{n-i} b^i$$