Subject: Recitation 15

Year: Month: Date:

BOOKKEEPER

1 The Tao of ~~Bookkeeper~~

1 $4!$

2 $4!$

3 A 2

B 3

C 2

D 3

E 1

F 1

4 ~~Total Surjective~~ 2-to-1

5 $\frac{4!}{2}$

6 $\frac{6!}{3!}$

P

RE^E E K

7 ~~KEEPER~~

1 2 3

1 3 2

2 1 3

2 3 1

3 1 2

3 2 1

GANJINEH

Subject: Year: Month: Date:

8 6-to-1

~~7~~ 9 $\frac{6!}{3!}$

~~8~~ 13 $\frac{(1+2+2+3+1+1)!}{1!2!2!3!1!1!}$

10 ~~8~~ $\frac{10!}{}$

11 ~~9~~ $\frac{10!}{2!}$

12 ~~10~~ $\frac{10!}{2!2!}$

14 $\frac{(1+\cancel{4}5+2+2)!}{1!5!2!2!}$

15 $\binom{n}{k}$

2 Pigeonhole Principle

1 Days of the year $\xrightarrow{\text{B.Day}}$ People

365 500

2 yes. Student Ids $\xrightarrow{\text{54m}}$ {1,…,81}

3 $\underbrace{\text{Classes of } \overset{115}{} \overset{37}{\equiv}}_{37}$ $\xleftrightarrow[\overset{37}{\equiv}]{}$ ints 100

~~4~~

3 More Counting Problems

1 Set we know: Split every permutation into firs k and the rest. undo the Permutations of the splits by the divison rule. ~~that we have~~

$\frac{n!}{k!(n-k)!}$

Bijection: take the first k.

2 $\binom{16}{4}$ 12 0s and 4 1s.

3 $\left(\frac{8!}{2!2!1!1!2!}\right)$

4 $\frac{102!}{2^{52}!}$

Subject: Year: Month: Date:

4 Fun with Phonology: Hawaiian

1 $|VVVV| + |CVVV| + |VCVV| + |VVCV|$

$+ |CVCV| = 25^4 + 8 \cdot 25^3 + 8 \cdot 25^3 + 8 \cdot 25^3$

$+ 8^2 \cdot 25^2$

2 Because when we have C we always have CV then $K \leq n/2$

$\longrightarrow |A| = \sum_{i=0}^{n/2} |A_i|$

3 We merge all K CV's into 0's.

So we have n-K digits.

4 $|A_K| = \binom{n-K}{K} \cdot 8^K \cdot 25^{n-K}$

↑

5

6 $|A| = \sum_{K=0}^{n/2} |A_K| = \sum_{K=0}^{n/2} \binom{n-K}{K} \cdot 8^K \cdot 25^{n-K}$

GANJINEH