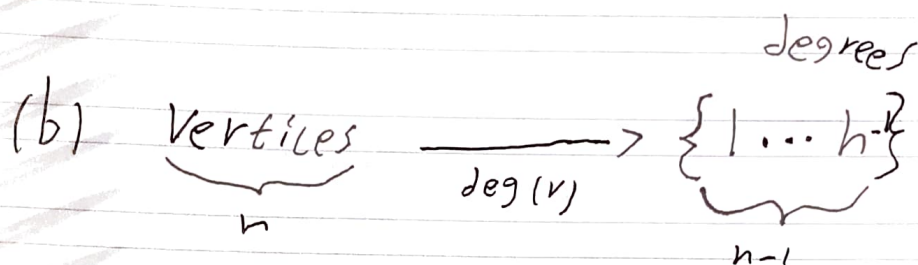
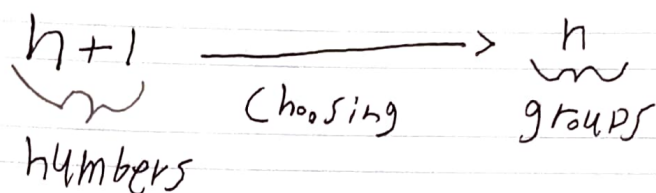


## Problem 1

(a) group <sup>2</sup>  $\wedge$  consecutive numbers.



## Problem 2

$$\begin{aligned} & |S_{All}| - |S_{18062}| - |S_{6042}| \\ & - |S_{35876}| + |S_{1\dots} \cap S_{6\dots}| + |S_{6\dots} \cap S_{3\dots}| \\ & + |S_{1\dots} \cap S_{3\dots}| - 3 |S_{1\dots} \cap S_{2\dots} \cap S_{6\dots}| = \end{aligned}$$

$$9! - 6! - 7! - 6! + 0 + 3! + 0 - 0 =$$

Problem 3

$$(a) 13 \cdot \binom{4}{2} \cdot 4^3 \cdot \binom{12}{3}$$

$$(b) \binom{n+k+1}{k}$$

(c) We add an extra variable  $x_{k+1}$

And then ignore it in the original

$$\text{sum. } \binom{n+k+1}{k+1}$$

$$(d) 2^{\binom{n}{2}}$$

$$(e) 2^{n^2}$$

$$(f) 2^{\binom{n}{2}}$$

(g) We map it to a totally ordered set.  $n!$

$$(h) \cancel{1} \cancel{2} \cancel{3} \cancel{4} \cancel{5} \cancel{6} \cancel{7} \cancel{8} \cancel{9} \cancel{10} \cancel{11} \cancel{12} \cancel{13} \cancel{14} \cancel{15} \cancel{16} \cancel{17} \cancel{18} \cancel{19} \cancel{20}$$

$$|S_2| + |S_5| + |S_7| - |S_2 \cap S_5| - |S_2 \cap S_7| - |S_5 \cap S_7|$$

$$+ 3 |S_2 \cap S_5 \cap S_7| = \frac{700}{2} + \frac{700}{5} + \frac{700}{7} - \frac{700}{2 \cdot 5}$$

$$- \frac{700}{2 \cdot 7} - \frac{700}{5 \cdot 7} + 3 \frac{700}{2 \cdot 5 \cdot 7}$$

$$(i) \binom{n+k-1}{k-1} \cdot h!$$

$$(j) k! \binom{n}{k} (h-k)! \binom{h-k+k-1}{k-1}$$

Subject:

Year:

Month:

Date:

## Problem 4

(Place of \*,  $\{0, 1\}^{n-1}$ )  $\rightarrow n 2^{n-1}$

(Place of  $k$  non zero digits, Place of \*)

$$\rightarrow \sum_{k=1}^n \binom{n}{k} k$$

## Problem 5

$n$  is odd  $\rightarrow \binom{2n}{n}$  has unequal number of reps.

$$\rightarrow \frac{1}{2} \binom{2n}{n} \text{ have more dems.}$$

$n$  is even  $\rightarrow \binom{2n}{n} - \binom{n}{n/2} \binom{n}{n/2} \parallel 1, 1, 1$  reps.

$$\rightarrow \frac{1}{2} \left( \binom{2n}{n} - \binom{n}{n/2} \binom{n}{n/2} \right)$$