$7 = 5 + 2$
$|X| = |A| + |B|$

disjoint union of sets

addition
size of disjoint union of sets

Kha Le

CSC 2259 (1/28/20) Notes

Symmetry: $C(n,m) = C(n, n-m)$

rows of pascal

$n=5, m=3$

$\{a,b,c,d,e\}$

0	5	3-subsets		2-subsets
$\{\}$	$\{a,b,c,d,e\}$	$\{a,b,c\}$	and so on...	$\{a,b\}$
		$\{a,b,d\}$		$\{d,c\}$

~~apparently you can connect via exclusion~~

$\{a,b,c\} \longleftrightarrow \{d,e\}$

X linked to X^c

$|X|$ = size of X
= #(items in X)
= Cardinality of X

$|X| = m \quad |X^c| = n-m$

items start with

complement of a set X = set of items not in X

$\bar{X} = X^c$ = complement of C $\quad \{d,e\} = \{a,b,c\}^c$

Every m-subset X is related to its complement X^c which is an $(n-m)$-subset.

This is 1-1 and onto relation

no X is related to two or more $(n-m)$-subsets

nor two different X's are related to same complement.

$C(5,2) = C(4,1) + C(4,2)$ $\quad$ #(m-subsets of $\{1,2,\dots,n-1\}$)

$C(n,m) = C(n-1,m-1) + C(n-1,m)$

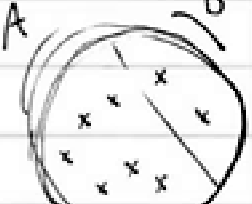
#((m-1)-subsets of $\{1,2,\dots,n-1\}$)

Intersection

$(A \cap B = \emptyset$

A and B has no common item

A B



X

$X = A \cup B$
union (disjoint)
(put together)

leading up to proof of symmetry property of $C(n,m)$

#(m-subsets of $\{1,2,\dots n\}$)

3-subsets of $\{a,b,c,d,e\}$

$n=5, m=3$

2-subsets of $\{a,b,c,d\}$

	$\{a,b,c\}$			
	$\{a,b,d\}$	B		
	$\{a,b,e\}$		$\{a,b\}$	
A	$\{b,c,d\}$			
	$\{b,c,e\}$		$\{b,c\}$	
	$\{a,c,d\}$			
	$\{a,c,e\}$		$\{a,c\}$	$\{a,b,c\}$
	$\{a,d,e\}$		$\{a,d\}$.	$\{a,b,d\}$.
	$\{b,d,e\}$		$\{b,d\}$	$\{b,c,d\}$
	$\{c,d,e\}$		$\{c,d\}$	$\{a,c,d\}$

3-subsets of $\{a,b,c,d\}$

$$C(5,3) = C(4,2) + C(n-1,m)$$
$$10 = 6 + 4$$