A set is a collection of elements

↑

e.g. Obj, Sets, ---

$S = \{1, 2, \{3,4\}\}$

$\Rightarrow 1 \in S,\ 2 \in S \quad 3 \notin S \quad 4 \notin S. \quad \{3,4\} \in S.$

Power Set :

Let A be a finite set, then the power set of A is the collection: $P(A) = \{ S : S \subseteq A \}$

put all possible subsets of A into a set

e.g. Take $A = \{1,2,3\}$.

$$P(A) = \{\{1\},\{2\},\{3\},\{1,2\},\{1,3\},\{2,3\},\{1,2,3\},\phi\}.$$

Note: $|A|$ = number of element in A.

$$|P(A)| = 2^{n^2}$$

Partition of a set:

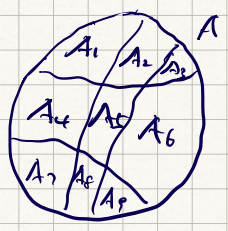
Let A be a non-empty set, then the partition π of A is a collection of non-empty subsets of A that are mutually disjoint and whose union is A.

$$\pi = \{A_1, \dots A_n\}$$

Such that the following condition is satisfied.

1. $A_1, A_2 \dots A_n \neq \phi$
2. $A_1, A_2 \dots A_n \subseteq A$.
3. $A_i \cap A_j = \phi$ where $i \neq j$.
4. $A_1 \cup A_2 \dots A_n = A$.

$\Rightarrow$



Sequences and Sums.

A sequences is a function $f: S \to R$ where $S \subseteq Z$

$f: \{1, 2 \cdots\} \to R$.

$f(1), f(2), f(3) \cdots \Rightarrow f_1, f_2, f_3 \cdots$

e.g. $f: Z_+ \to R$. ← a function define as $f: x^2$.

常数 1. Constant Sequences. ← define by constant number.

e.g. 1, 1, 1, 1, 1

等比 2. Geometric Sequences ← the ratio of any power consecutive terms

e.g. $a, ar, ar^2, ar^3 \cdots$ is a constant.

等差 3. Aritbmetic Sequences ← difference of a pair of consecutive term

e.g. $a, a+d$ $a+2d \cdots$

Sum of sequences:

Induction.

Let $P(n)$ is a statement parameterized by $n \in Z_+$.

(1) $P(1)$ is true.

(2) $P(k) \Rightarrow P(k+1)$ for any positive integer

then $P(n)$ is true for all positive integer

$P(1) \Rightarrow P(2) \Rightarrow P(3) \Rightarrow \cdots$

true true true true.

true true