8\23\10

Count mappings:

$[m] = \{1, 2, \ldots, m\}$

How many functions are there from

$$[n] \longrightarrow [m]$$

Answer: m^n

Choose f:

choices for $f(1)$ is m

choices for $f(2)$ is m

choices for the pair $f(1), f(2)$ is: m^2

⋮

choices for $f(1), f(2), \ldots, f(n)$ is m^n.

This also counts the number of sequences

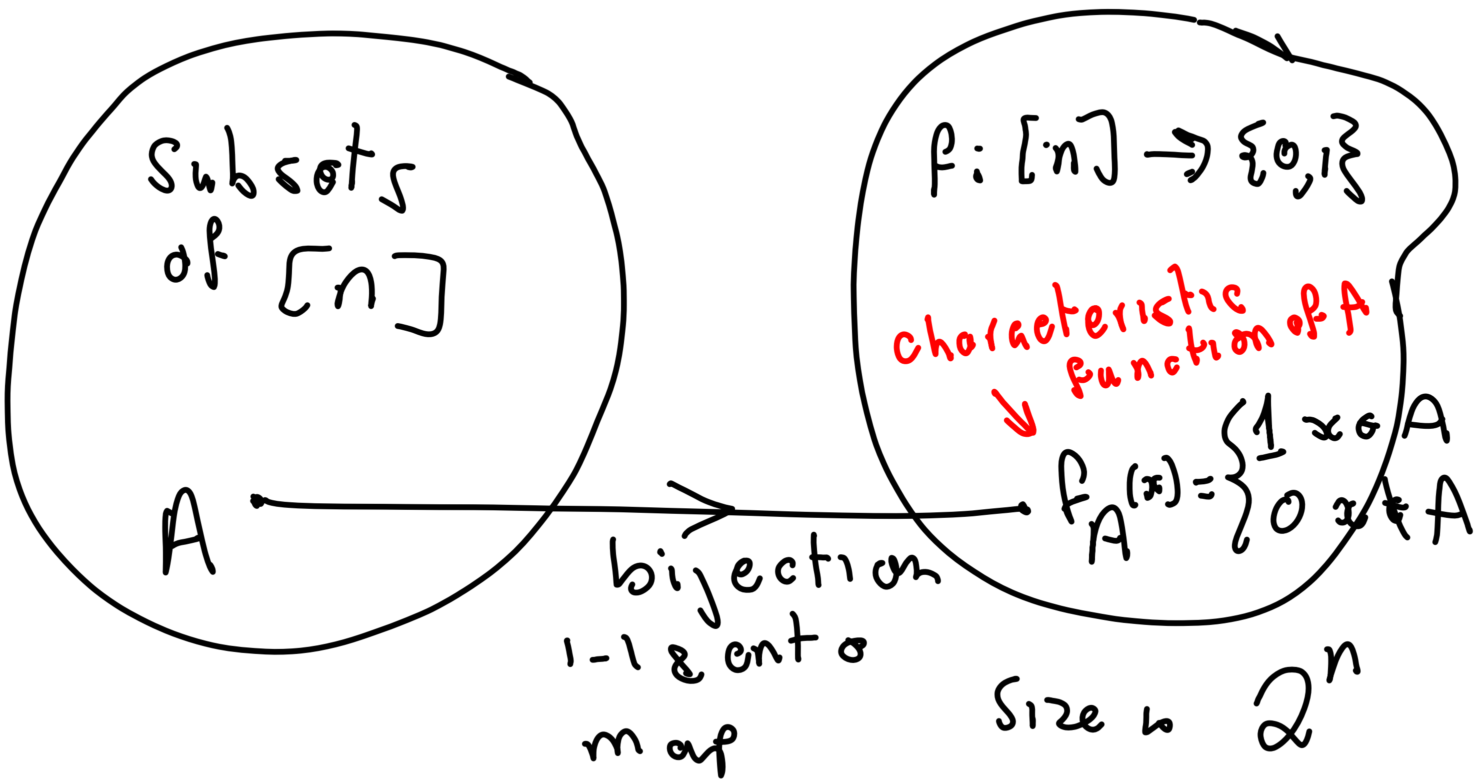
$x_1, x_2, \ldots \ldots x_n$

where $x_j \in [m]$

$$x_j \equiv f(j)$$

$\psi(n) = \#$ of subsets of $[n]$

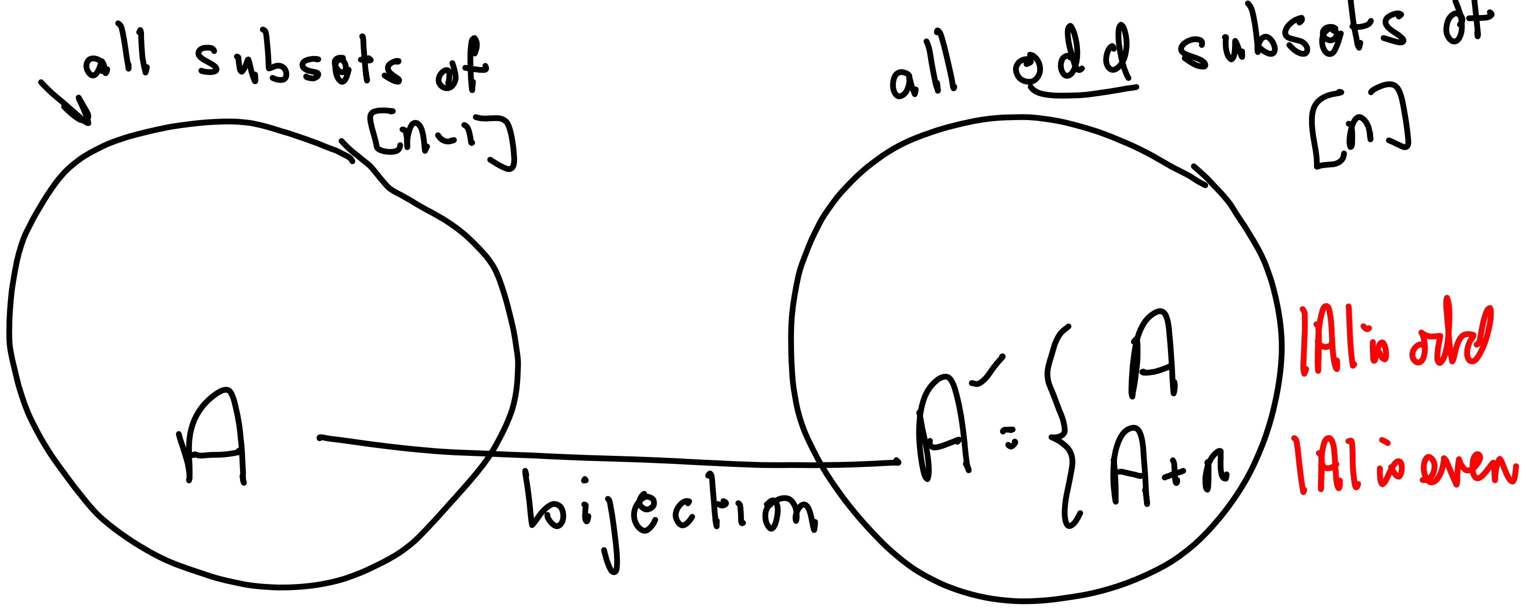
$$\psi(n) = 2^n$$



$\psi_{odd}(n)$ = # subsets of $[n]$ that are odd

ψ_{even} = # . . even

$$\psi_{odd}(n) = \psi_{even}(n) = 2^{n-1}$$



How many 1-1 mappings from

$[n] \longrightarrow [m]$

m choices for $f(1)$

given $f(1)$, there are $m-1$ choices for $f(2)$

$\vdots$

given $f(1), \ldots, f(k)$, there are $m-k$ choices for $f(k+1)$

$\#$ 1-1 function $= m(m-1) \cdots (m-n+1)$

This also counts

# of sequences

$x_1 x_2 \cdots x_n$

where $x_j \in [m]$

and $x_i \neq x_j \quad \forall i,j$

$m = n$: $\# = n! = $ # permutations