

## Conjuntos y conteo

Universo: Es el conjunto de todos los elementos que estoy estudiando. En probabilidad lo llamamos espacio muestral.

$$U = E = S$$

$$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \quad \#U=10$$

$$A = \{2, 4, 6, 8, 10\} \quad \#A=5$$

$$B = \{1, 3, 5, 7, 9\} \quad \#B=5$$

$$C = \{2, 3, 5, 7\} \quad \#C=4$$

$$A \cap B = \emptyset$$

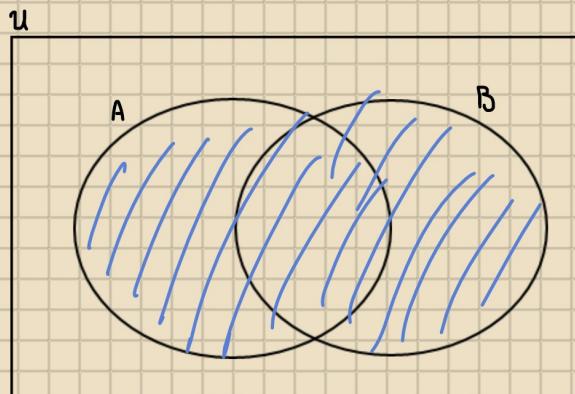
$$B \cap C = \{3, 5, 7\}$$

$$A \cup C = \{2, 3, 4, 5, 6, 7, 8, 10\}$$

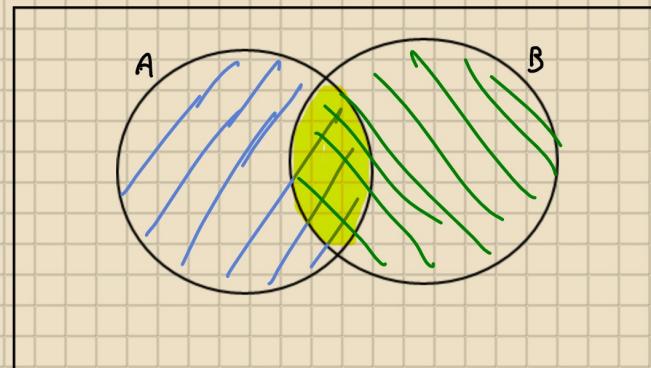
$$\bar{A} = A' = A^c = \{1, 3, 5, 7, 9\}$$

$$\bar{C} = \{1, 4, 6, 8, 9, 10\}$$

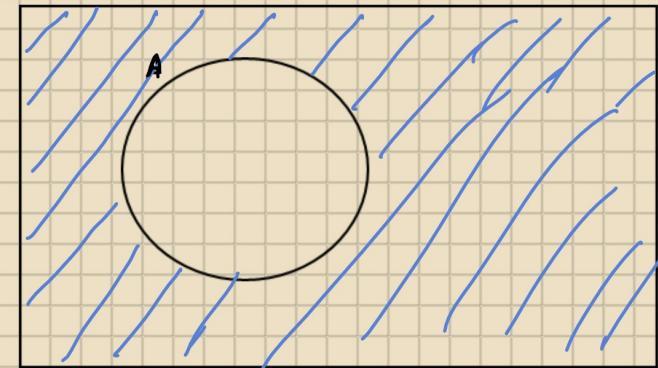
Unión de A y B



Intersección de A y B



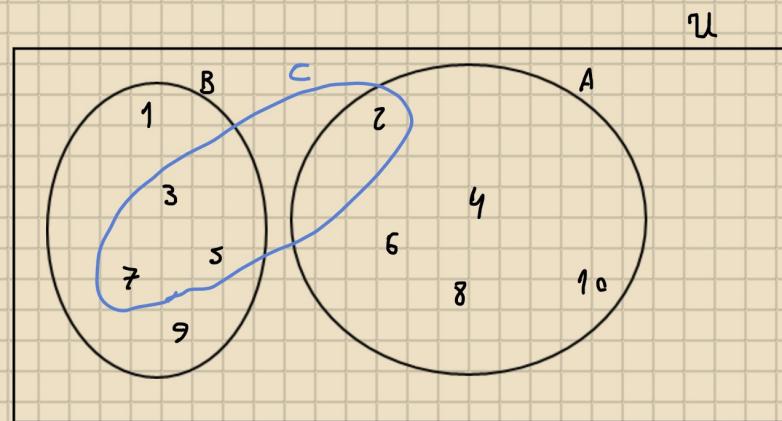
COMPLEMENTO DE A



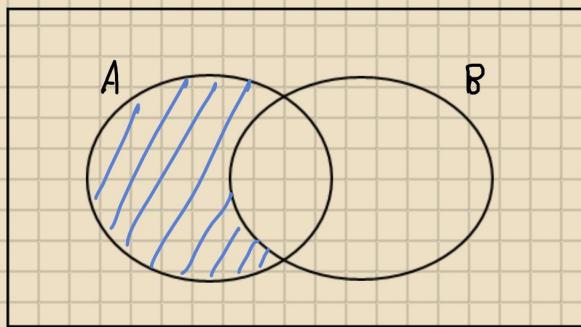
A = "Nº PARES"

B = "Nº IMPARES"

C = "Nº PRIMOS"



Sólo A o A - B



$$\#(F \cup V) = 140$$

$$\#(F \cap V) = \#F + \#V - \#(F \cup V)$$

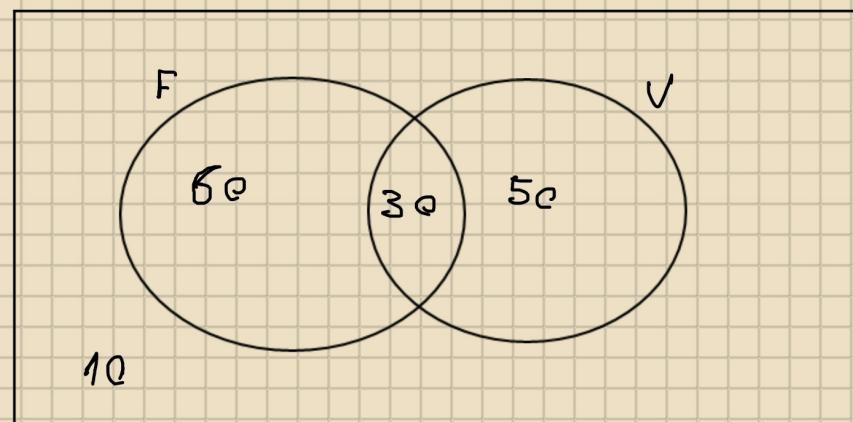
$\uparrow$        $\uparrow$        $\uparrow$       ~~X~~

$$\#(F \cap V) = \#F + \#V - \#(F \cup V) = 90 + 80 - 140 = 30$$

$$\#\overline{(F \cup V)} = 10$$

Se encuesta a los 150 alumnos de probabilidad y estadística del turno noche sobre si practican futbol o voley. 90 dijeron que practican futbol, 80 dijeron que practican voley y 10 no practican ninguno de los dos deportes.

¿Cuantos alumnos practican ambos deportes?



N = "NO PRACTICA NINGUNO"

factorial

$$n! = n \cdot (n-1) \cdot (n-2) \cdot \dots \cdot 3 \cdot 2 \cdot 1$$

$$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

$$1! = 1$$

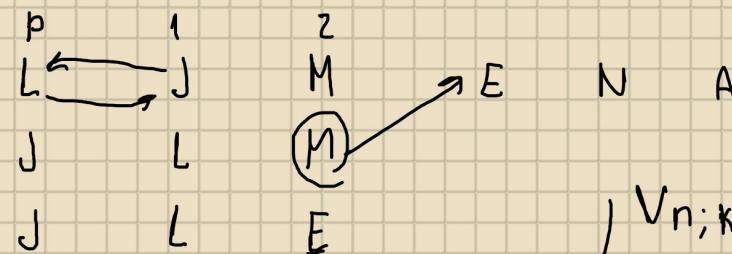
$$0! = 1$$

## Variaciones simples

$$n=10$$

$$k=3$$

- importa el orden



$$\boxed{V_{n,k} = \frac{n!}{(n-k)!}}$$

$$V_{10,3} = \frac{10!}{(10-3)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 720$$

## Permutación

Es un caso especial de la variación simple en la que intervienen todos los elementos al formar los grupos.

$$V_{n,n} = P_n = \frac{n!}{(n-n)!} = \frac{n!}{0!} = \boxed{n!}$$

1 2 3 4 5

↙ 1 2 3

n=5

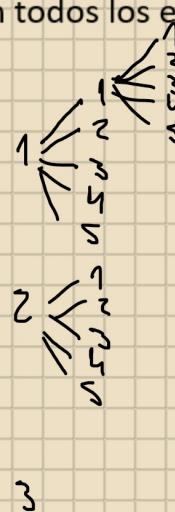
k=3

1 2 2

1 2 1

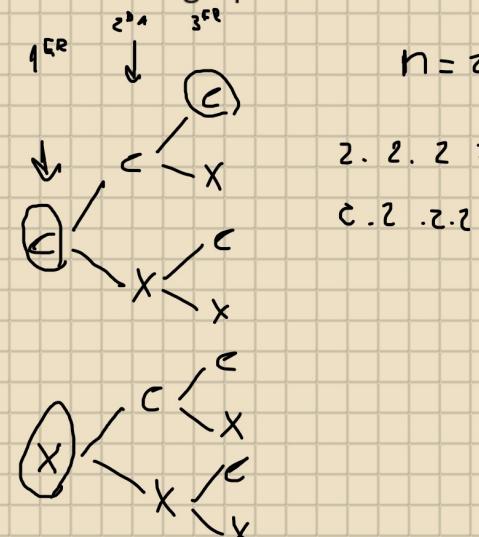
1 1 1

$$\boxed{V_{n,k} = n^k}$$



4

5



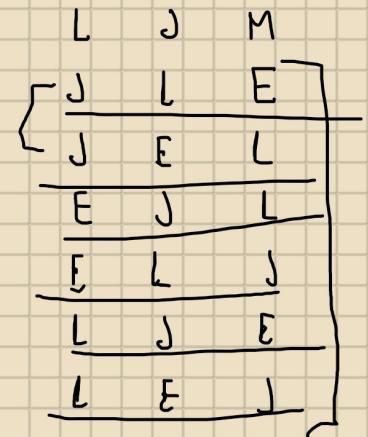
$$\begin{aligned} n &= 2 \\ 2 \cdot 2 \cdot 2 &= 2^3 \\ 2 \cdot 2 \cdot 2 \cdot 2 &= 2^4 \end{aligned}$$

Combinatoria:

-No importa el orden.

-Si intercambio dos elementos del grupo, obtengo el mismo grupo.

-Si intercambio un elemento del grupo por otro que no lo integra, obtengo un grupo diferente.



(L J M N E)

$$n = 5$$

$$P_5 = 5! = 120$$

$$V_{n,k} = \frac{n!}{(n-k)!}$$

$$C_{n,k} = \frac{n!}{\binom{n}{k} (n-k)! \cdot k!}$$

$$C_{5,3} = \frac{5!}{(5-3)! \cdot 3!} = \frac{5 \cdot 4 \cdot 3!}{2! \cdot 3!} = 10$$

$$P_{n-1} = (n-1)!$$

$$V_{n,k} = \frac{n!}{(n-k)!}$$

$$P_n = n!$$

$$V'_{n,k} = n^k$$

$$C_{n,k} = \frac{n!}{(n-k)! \cdot k!}$$

1 2 3 4 5

1 3 2 4 5

1 3 4 2 5

1 3 4 5 2

1 4 3 5 2

1 5 4 3 2

$$n = 5$$

$$k = 3$$

$$k = n$$

$$P_n = n! = 5! = 120$$

