

# Tableau 2, Part 1

Combinatorial Elements: The Science of Counting


---





A finite set (population):  $\{a, b, c, d, e\}$



A finite set (population): {a, b, c, d, e}      {  }



A finite set (population):  $\{a, b, c, d, e\}$



- Curly brackets enclose sets
- Each element of the set can occur only once
- The order in which elements are listed does not matter

A finite set (population):  $\{a, b, c, d, e\}$



- Curly brackets enclose sets
- Each element of the set can occur only once
- The order in which elements are listed does not matter

A finite set (population):  $\{a, b, c, d, e\}$

Ordered sample

With replacement

(a, c, c)

(c, a, c)

(c, c, a)



- Curly brackets enclose sets
- Each element of the set can occur only once
- The order in which elements are listed does not matter

A finite set (population):  $\{a, b, c, d, e\}$

Ordered sample	
With replacement	Without replacement
(a, c, c)	(a, c, d)
(c, a, c)	(a, d, c)
(c, c, a)	(c, a, d)
	(c, d, a)
	(d, a, c)
	(d, c, a)



- Curly brackets enclose sets
- Each element of the set can occur only once
- The order in which elements are listed does not matter

A finite set (population):  $\{a, b, c, d, e\}$

Ordered sample		Subset (subpopulation)
With replacement	Without replacement	
(a, c, c)	(a, c, d)	{a, c, d}
(c, a, c)	(a, d, c)	
(c, c, a)	(c, a, d)	
	(c, d, a)	
	(d, a, c)	
	(d, c, a)	



- Curly brackets enclose sets
- Each element of the set can occur only once
- The order in which elements are listed does not matter

A finite set (population):  $\{a, b, c, d, e\}$

Ordered sample		Subset (subpopulation)
With replacement	Without replacement	
(a, c, c)	(a, c, d)	{a, c, d}
(c, a, c)	(a, d, c)	
(c, c, a)	(c, a, d)	
	(c, d, a)	
	(d, a, c)	
	(d, c, a)	

- Round brackets enclose ordered samples
- The elements may or may not be permitted to be selected again (sampling with and without replacement)
- The order in which elements are listed matters



# Sampling from finite sets

---



# Sampling from finite sets

---

- ❖ The universal set (or population) of size  $n$ :  $\{a_1, a_2, \dots, a_n\}$



# Sampling from finite sets

---

- ❖ The universal set (or population) of size  $n$ :  $\{a_1, a_2, \dots, a_n\}$
- ❖ A sample of size  $k$ :
  - ❖ Ordered sample (with or without replacement):  $(a_{j_1}, a_{j_2}, \dots, a_{j_k})$
  - ❖ Subset (or subpopulation):  $\{a_{j_1}, a_{j_2}, \dots, a_{j_k}\}$