🔹 What is a Set?

- A **set** in Python is a collection of **unique** items.
- That means: no duplicates are allowed.

Example:

```
my_set = {1, 2, 3, 3, 2}
print(my_set)  # {1, 2, 3}
```

- Duplicate values automatically get removed.

🔹 Math Connection

Sets in Python are inspired from **mathematical sets**.

- They are **unordered** (no fixed position like lists).
- They are used for operations like **union, intersection, difference**.

🔹 Operations on Sets

Union (A ∪ B) → Combines everything but removes duplicates.

```
A = {"ginger", "cardamom", "cinnamon"}
B = {"ginger", "cloves", "black pepper"}

print(A | B)
# {'ginger', 'cardamom', 'cinnamon', 'cloves', 'black pepper'}
```

1.

Intersection (A ∩ B) → Common elements between two sets.

```
print(A & B)
# {'ginger'}
```

2.

Difference (A - B) → Elements only in A but not in B.

```
print(A - B)
# {'cardamom', 'cinnamon'}
```

3.

🔹 Membership Test

Check if an item exists in a set:

```
print("ginger" in A)   # True
print("cloves" in A)  # False
```

🔹 Frozen Set

- A **frozen set** is like a normal set but **immutable** (cannot be changed after creation).

Example:

```
fs = frozenset([1, 2, 3])
# fs.add(4)  ❌ This will give error (not allowed)
```

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🌶️ Example with spices

- **Essential spices**: `{ginger, cardamom, cinnamon}`
- **Optional spices**: `{ginger, cloves, black pepper}`

✅ **Union** = all spices = `{ginger, cardamom, cinnamon, cloves, black pepper}`
✅ **Intersection** = common = `{ginger}`
✅ **Difference (only in essential)** = `{cardamom, cinnamon}`

👉 So the key takeaway:

- **Set = unique collection**
- Supports **math-like operations** (union, intersection, difference)
- Useful for removing duplicates, comparing data, and fast membership checks.