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Sets

- group of unordered elements (objects)
- no repeats

Metaphor: Folder (=set) on computer

- Contains files + folders
  - a set can contain other sets as elements
- Could be empty
- Can't contain same object twice

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Roster Notation:

$A = \{0, 2, 5\}$ means "A is the set containing the elements 0, 2, 5."

Since order doesn't matter: $A = \{2, 0, 5\}$ ⇐ same set
$A = \{5, 2, 0\}$

$\in$: $2 \in A$ is a statement. True if 2 is element of A.

$\notin$: "dog" $\notin A \equiv \neg$ "dog" $\in A$. True if "dog" is not an element of A.

Sets in Sets

$T = \{x, y, \{g, h\}, k\}$

an element of a set can be another set

Q: Is $g \in T$? Is $\{g, h\} \in T$?

A) Yes. Yes. B) Yes. No. **C) No. Yes.** D) No. No.

elements of T are x, y, $\{g, h\}$, k

*Also $\{x\ y\} \notin T$

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Famous Sets

$\emptyset$ = empty set = $\{\}$

$\mathbb{N}$ = set of natural numbers = $\{1, 2, 3, \dots\}$

$\mathbb{Z}$ = set of integers = $\{\dots -3, -2, -1, 0, 1, 2, 3 \dots\}$

$\mathbb{R}$ = set of real numbers

$\mathbb{Q}$ = set of rational numbers (fractions)

NOTE: In some books, $\mathbb{N} = \{0, 1, 2, 3, \dots\}$

↑ starts at 0.