Set Builder Notation

Style 1.

$$\{\text{expression} : \text{rule}\}$$

- "expression": what elements look like
- "rule": what elements must $\mathbb{B}$ do satisfy
- "$\{$": set of
- ":": such that

$$\{2n : n \neq 0\}$$
$$\Downarrow$$
2. (foot)

Examples. ① $\{2n : n \in \mathbb{Z}\}$ is the set of even integers

"the set of numbers of the form $2n$, such that n is an integer."

② $\{x : x > 0,\ x \in \mathbb{R}\}$ = positive real numbers

(":" = and; $x > 0,\ x \in \mathbb{R}$ = test)

③ $\{x : x \in \mathbb{Z},\ x > 0\}$ = positive integers = $\mathbb{N}$

④ $\{y^2 : y \in \mathbb{Z}\}$ = perfect squares = $\{0, 1, 4, 9, \ldots\}$

Style 2

$\{ x \in \text{universe} : \text{rule} \}$

- $\{$ — the set of
- $x \in$ universe — where the elements are drawn from
- $:$ — such that
- rule — what elements must x do satisfy

Examples.

(1) $\{ x \in \mathbb{Z} : x \text{ is even} \}$ = even integers

(2) $\{ x \in \mathbb{R} : x > 0 \}$ = positive real numbers