

Goal

Delimiters are parenthesis-like symbols that enclose something, Examples: $\{ , \}$, $(,)$, $[,]$. Delimiters are used in describing sets. Our goal is to learn the basics about delimiters and sets.

Read “How to Use Latex Lessons” at LaTeX Lessons.

Common subsets of Real Numbers

Common subsets of the real numbers are: \mathbb{R} , \mathbb{N} , \mathbb{Z} , \mathbb{Q} , and $\mathbb{R} \setminus \mathbb{Q}$. Enclosing mathy stuff between $\$$ -signs puts the stuff into *math mode* (instead of the default *text mode*). You could of also expressed the list of subsets as: \mathbb{R} , \mathbb{N} , \mathbb{Z} , \mathbb{Q} , and $\mathbb{R} \setminus \mathbb{Q}$. The PDF outputs look the same but the Latex inputs vary. Common mistakes are to try \mathbb{R} , \mathbb{N} , \mathbb{Z} , \mathbb{Q} , *and* $\mathbb{R} \setminus \mathbb{Q}$ or to try $\mathbb{R}, \mathbb{N}, \mathbb{Z}, \mathbb{Q}$, and $\mathbb{R} \setminus \mathbb{Q}$. Compare the difference in the above 4 Latex inputs. We can also *display* (i.e., center) this list of sets as below

$$\mathbb{R}, \mathbb{N}, \mathbb{Z}, \mathbb{Q}, \text{ and } \mathbb{R} \setminus \mathbb{Q}.$$

The *equation environment* automatically puts us into *math mode* so we do not need the $\$$ signs.

Delimiters: $\{, \}, (,), [,]$

In LaTeX, only the delimiters $\{$ and $\}$ need the backslash (i.e., \backslash) before them. So it’s easy to do $\mathbb{R} = (-\infty, \infty)$. The delimiters are a bit too short in (btw: can also display with a double dolar sign $\$\$$)

$$\left(\frac{1}{2}, \frac{3}{4}\right]$$

so let’s do

$$\left(\frac{1}{2}, \frac{3}{4}\right] \text{ or (using some } \mathbf{newcommands} \text{ I have set up for you) } \left(\frac{1}{2}, \frac{3}{4}\right].$$

These **newcommands** I have set up for you are

- $\backslash lp$ and $\backslash rp$ for the left and right parentheses (and)
- $\backslash lb$ and $\backslash rb$ for the left and right bracket [and]
- $\backslash lc$ and $\backslash rc$ for the left and right curly { and }

Next, let’s learn by just looking at some latex input for some subsets of \mathbb{R} .

$$\{0, \pm 2, \pm 3, \pm 4, \dots\} = \{\dots, -4, -2, 0, 2, 4, \dots\} \quad (1)$$

$$\{2^n \in \mathbb{R} : n \in \mathbb{N}\} = \{2, 4, 8, 16, 32, 64, \dots\} \quad (2)$$

$$\{k^2 \in \mathbb{R} : k \in \mathbb{Z}\} = \{0, 1, 4, 9, 16, 25, 36, \dots\} \quad (3)$$

$$\mathbb{Z} \setminus \mathbb{N} = \{x \in \mathbb{R} : x \in \mathbb{Z} \text{ and } x \notin \mathbb{N}\} = \{0, -1, -2, -3, \dots\} \quad (4)$$

$$\left\{\frac{a}{b} \in \mathbb{R} : a, b \in \mathbb{R} \text{ and } b \neq 0\right\} \quad (5)$$

$$\left(\sqrt{2}, \pi\right] = \left\{x \in \mathbb{R} : \sqrt{2} < x \leq \pi\right\} \quad (6)$$