Here are symbols we use in math:

$\{\ \}$ Set notation. For example, $A = \{1,2,3\}$.

$\in$ **Element of.** E.g., $1 \in \{1,2,3\}$.

$\exists$ **There exists.**

$\ni$ **Such that**. In English, $a$ is divisible by $b$ if there is a $k$ such that $a \div b = k$.

In math, $a$ is divisible by $b$ if $\exists k \ni \frac{a}{b} = k$, where $a, b$, and $k$ are natural numbers.

$\forall$ **All.** For example, in English: the **inverse property** is that for every real number not zero there exists a reciprocal that is also a real number,
such that the product of the number and the reciprocal is one.

In math: if $R$ is the set of real numbers, $\forall a \neq 0,\ a \in R,\ \exists \frac{1}{a} \in R \ni a \times \frac{1}{a} = 1$.

$\Delta$ **Change**. E.g., $\Delta y = y_2 - y_1$.

$(a,b)$ **Ordered pair.** For example, the coordinates of a point $(x, y)$.

**Sets :**

$n(A)$ The **cardinality** of the set A. E.g., for $A = \{1,2,3\}$, $n(A) = 3$.

$\sim$ **Equivalence.** Sets $A$ and $B$ are equivalent, $A \sim B$ if $n(A) = n(B)$

$\varnothing$ The **empty** set. $\varnothing = \{\ \}$.

$\cup\ \cap$ **Union** and **intersection** Union means or, intersection means and.
E.g., $A \cup B$ means the set of elements that are either in $A$ **or** in $B$.
E.g., $A \cap B$ means the set of elements in both $A$ **and** $B$.

**Difference.** $A - B$ means the set of elements that are in $A$ and not in $B$.
E.g., $\{1,2,4\} - \{2,3\} = \{1,4\}$.

$\subseteq$ **subset**. For example, let $A$ and $B$ be sets. $A \subseteq B$.

$A \subseteq B$ if $\forall a \in A$ then $a \in B$.

Another definition of equality: $A = B$ if $A \subseteq B$ and $B \subseteq A$.

$\subset$ **proper subset**. For example, if $A \subset B$, then $A \subseteq B$ and $A \neq B$.

Slash through symbol means not. E.g., $\neq$ means not equal, or $\not\subset$ means not a subset.
E.g, $A \not\subset B$ means that $A$ is not a subset of $B$.
E.g., $a \notin A$ means that $a$ is not an element of the set $B$.

$\aleph_0$ Aleph null, the cardinality of the set of natural numbers, also called countable infinity.
E.g., $n(\{1,2,3,\ldots\}) = \aleph_0$.
Let us not confuse this with $\infty$, which is the last integer, as we count $1,2,3,\ldots$

$c$ The continuous infinity of real numbers. The number of points on a line between 0 and 1 is $c$.

*iff* : : **if and only if.** $A$ *iff* $B$ means $A$ implies $B$ AND $B$ implies $A$. $A \leftrightarrow B$.
For example: $\frac{a}{b} = \frac{c}{d}$ iff $a \times d = c \times b$.

$\therefore$ **Therefore.**

$f(x)$ **Function.** $f$ is a function of $x$. Given $x$, this gives $f$. E.g., $f(x) = mx + b$.
We may write it as $y(x)$.

! **Factorial.** $n! = n(n-1)(n-2)...1$

$\sum_{i=0}^{n} f(i)$ means we sum the function $f(i)$ from $i = 0$ to $i = n$.

Written out, this is $f(0) + f(1) + f(2) + \ldots + f(n)$

E.g., $\sum_{i=1}^{3} (i+1) = 2 + 3 + 4$.

In a similar fashion $\prod_{i=0}^{n} f(i)$ means we take the product of $f(i)$ from $i = 0$ to $i = n$.

Written out, this is $f(0) \times f(1) \times f(2) \times \ldots \times f(n)$

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