The most important symbol in mathematics

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1 The scariest part of mathematics

Mathematics usually scares and drives away many people because of the various symbols and alphabetical letters (even from non-English languages) used by mathematicians in all mathematical narrations. These symbols have become a part of the "language of mathematics". To appreciate mathematics, we must understand the language of mathematics, and hence understand the symbols involved in mathematics. The symbols have rigid meanings and rules of usage, which dissuade the uninitiated and uninformed. To make matters worse, there is a bewildering collection of symbols used in mathematics. Symbols are used in mathematics, since, by and large, such symbols reduce ambiguity and render the narration more compact and focussed. But, their abuse may sometimes turn off many people and make them shun mathematics.

In an effort to select one symbol amongst this plethora, we choose the = symbol, since it is the most important and most commonly used symbol in mathematics.The equal symbol (=) (equals sign, equality sign, equal sign) was first used by Robert Recorde (c. 1510-1558) in 1557 in The Whetstone of Witte [1]. The symbol used by Recorde reminds us that nothing could be more equal than parallel straight lines with the same length. The etymology of the word "equal" is from the Latin word "aequalis", as meaning "uniform", "identical", or "equal", from aequus ("level", "even", or "just").

2 Equations in mathematics

An equation is a mathematical statement that asserts the equality of the two expressions (or objects), placed on either side of a = sign. Equations form the most common and fundamental basis of a lot of mathematical ideas and concepts, at the heart of it all, is the = symbol.

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[1]Text marked in wine-red color are click-sensitive hyperlinks.

The legendary Indian mathematician Srinivasa Ramanujan glorified equations in a famous statement attributed to him:

> *An equation means nothing to me unless it expresses a thought of God.*

It is not surprising that Ramanujan chose to use equations to invoke some pious thoughts about mathematics.

"Solving" an equation containing variables, consists of determining which values of the variables make the equality true. The variables for which the equation has to be solved are also called unknowns, and the values of the unknowns that satisfy the equality are called solutions of the equation.

The equals sign = obeys two fundamental properties:

1. **Symmetry**
   $(A = B) \implies (B = A)$

2. **Transitivity**
   $(A = B) \text{ and } (B = C) \implies A = C$

An interesting extension of "equality" is "inequality", denoted by $A \neq B$. In some cases, it is necessary to show/verify that two objects are NOT equal. In mathematics, the inequality property is as useful as the equality property.

The above ideas are often combined and used in many contexts, to derive various, interesting mathematical identities and relations [2]. They are also essential in deriving proofs by deduction. Since proof is essential for all mathematical assertions and reasoning [3], equations are inevitable for mathematics.

The verdict is clear: *There is nothing equal to the = symbol in mathematics (pun intended).*

3   Closing Remarks

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