The concept of functions

Abstract

Functions are fundamental in mathematics, linking areas like algebra, calculus, and differential equations. In both math and programming, they streamline and structure tasks, ranging from straightforward calculations to elaborate programming challenges, thereby abstracting complexity and offering a unified approach to solving a variety of problems.

Mathematical Functions

A mathematical function is a relation between a set of inputs and a set of permissible outputs. It's typically expressed as $f(x)$, where x is the input, and $f(x)$ is the output. The function defines a specific operation that is performed on x to produce $f(x)$. For example, $f(x) = x^2$ is a function where the output is the square of the input.

$Step - 1$: Choose Variable : Select x as the independent variable.

$Step - 2$: Define Relationship : Determine how x affects $f(x)$.

$Step - 3$: Write Function Rule : Express as $f(x) =$ relationship.

$Step - 4$: Specify Domain (Optional) : Define possible values of x.

$Step - 5$: Specify Range (Optional) : Define possible outputs of $f(x)$.

Python Functions

In Python, a function is a section (*block*) of code that only runs when it is called. It can take data as input (*parameters*), perform operations on these inputs, and can also return data as output. Just as a mathematical function can be used repeatedly for different inputs, a Python function can be called multiple times with different arguments.

```python
# Use 'def' followed by the function
# name and parentheses with parameters
def square_function(x):

    square = x**2       # Function logic
    return square       # Return a Value (Optional)


--------------------------------------------------
# Use the function with the required arguments
result = square_function(5)
print(result) # Will print 25
```

Author: Karl-Fredrik M. Hagman