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A Study of Generalized Mathematical Functions and their Applications

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ABSTRACT

As we know that we are in a great need of mathematical function to solve many issues of engineering, physics, mathematics, air pollution, traffic etc. etc. but still we are having confusion for the layman to solve this issue as you are not well where with this mathematical function. A function is a duplex relation above two sets which are associates to every part of the first set absolutely one element to the second set functions were first the excitation of how are wearing quantity depends on another quantity. Early age of this is related with few ideas on cooperation calculus so here we are trying to make a valuable study regarding few of mathematical functions. In mathematics, generalized functions are objects extending the notion of functions. There is more than one recognized theory, e.g. the theory of distributions.

1. Introduction

Functions were originally the idealization of how a varying quantity depends on other quantity. For example, the place of a planet is a *function* of time. Mainly , the concept was introduced with the calculus at the end of the 17th century, and, until the 19th century, the functions that were considered were differentiable. The idea of function was formalized at the end of the 19th century in terms of set theory, and this greatly enlarged the domains of application of the concept.

A function is a process or a relation that associates each element x of a set X, the domain of the function, to a single element y of another set Y (possibly the same set), the domain of the function. If the function is called f, this relation is denoted $y = f(x)$ (which is spoken aloud as f of x), the element x is the *argument* or *input* of the function, and y is the *value of the function*, the *output*, or the *image* of x by f. The symbol that is used for representing the input is the variableof the function (one often says that f is a function of the variable x).

A function is represented by the set of all $(x, f(x))$, called the graph of the function. When the domain and the codomain are sets of real numbers, each such pair may be considered as the Cartesian of a point in the plane. The set of these points is called the graph of the function; it is a popular means to illustrate the function. Here we discuss different different kind of usage of functions.

Table of values

A table of values is commonly observed when describing a function.

This shows the correspondence between a set of values of X and a set of values of y in a tabular form.

Is it a function or not?

1. A car and its plate number
2. Student and his cell phone
3. Employee and his ID card
4. A pen and colour of its ink

Examples:-

Let $f(x)=x^2-4x+4$. Find the following value of the function.

a. f(2)
b. f(-1)
c. f(0)
d. f(-1/2)
e. f(-4)

Let $g(x)=\sqrt{3x-4}$. Find the following values of the function.

a. g(2)
b. g(4)
c. g(0)
d. g(9)
e. g(-1/3)

2. Evaluating functions

It is the process of determining the value of the function at the number assigned to a given variable.

3. Domain and range of functions

Domain of D a function
It is the set of all X coordinates in the set of ordered pairs.
Range R of a function
It is the set of all y coordinates in the set of ordered pairs.

4. More on independent variables

There are instances in which not all values of the independent variables are permissible.
That is some functions have restrictions

5. Piecewise functions

These are functions which are defined in defined in different domains since they are determined by several equations

6. Operations on functions

If f and g are functions then
(f+g) =f(x)+g(x)
(f-g) =f(x)-g(x)
(f.g) =f(x). g(x)
(f/g) (x)=f(x)/g(x)where g(x)≠0

7. Even and odd Functions

A function f is said to be even if f(-x)=f(x) for each value of x in the domain of f.

A function f is said to be odd if f(-x)=-f(x) for each value of x in the domain of f.

Example:- Determine whether each of the following function is even , odd or neither

$f(x)= 4x^4 -3x^2-10$
$f(x)=-x^5+3x^3-12x$
$f(x)=4x^3 -4x^2 -8x-2$

8. Common functions

Many widely used mathematical formulas are expressions of known functions. For example, the formula for the area of a circle, $A = \pi r^2$, gives the dependent variable A (the area) as a function of the independent variable r (the radius). Functions involving more than two variables also are common in mathematics, as can be seen in the formula for the area of a triangle, $A = bh/2$, which defines A as a function of both b (base) and h (height). In these examples, physical constraints force the independent variables to be positive numbers. When the independent variables are also allowed to take on negative values—thus, any real number—the functions are known as real-valued functions.

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