

ANSWER on Question #76142 – Math – Calculus

QUESTION

Define function algebraically and geometrically.

SOLUTION

1) Algebraic definition

1.a) Formal definition:

A function $F(x_1, x_2, x_3, \dots, x_n)$ is said to be algebraic at a point $A = (a_1, a_2, a_3, \dots, a_n)$ if there exists a neighborhood of a point A at which the identity

$$P(F(x_1, x_2, x_3, \dots, x_n), x_1, x_2, x_3, \dots, x_n) = 0$$

is true where P is a polynomial in $(n + 1)$ variables.

1.b) Informal definition:

An algebraic function is a function that involves only algebraic operations, like, addition, subtraction, multiplication, and division, as well as fractional or rational exponents. Think of an algebraic function as a machine, where real numbers go in, mathematical operations occur, and other numbers come out.

We call the numbers going into an algebraic function the input, x , or the domain. Any number can go into a function as long as it is not divided by zero or does not produce a negative square root. A function can perform many mathematical operations with a domain as long as the range is one value for each domain used. We call the numbers coming out of a function the output, y , or the range. Remember, one value in, one value out.

2) *Geometric definition*

In mathematics, the **graph** of a function f is, formally, the set of all ordered pairs $(x, f(x))$, and, in practice, the graphical representation of this set. If the function input x is a real number, the graph is a two-dimensional graph, and, for a continuous function, is a curve. If the function input x is an ordered pair (x_1, x_2) of real numbers, the graph is the collection of all ordered triples $(x_1, x_2, f(x_1, x_2))$, and for a continuous function is a surface.

(More information: https://en.wikipedia.org/wiki/Graph_of_a_function)