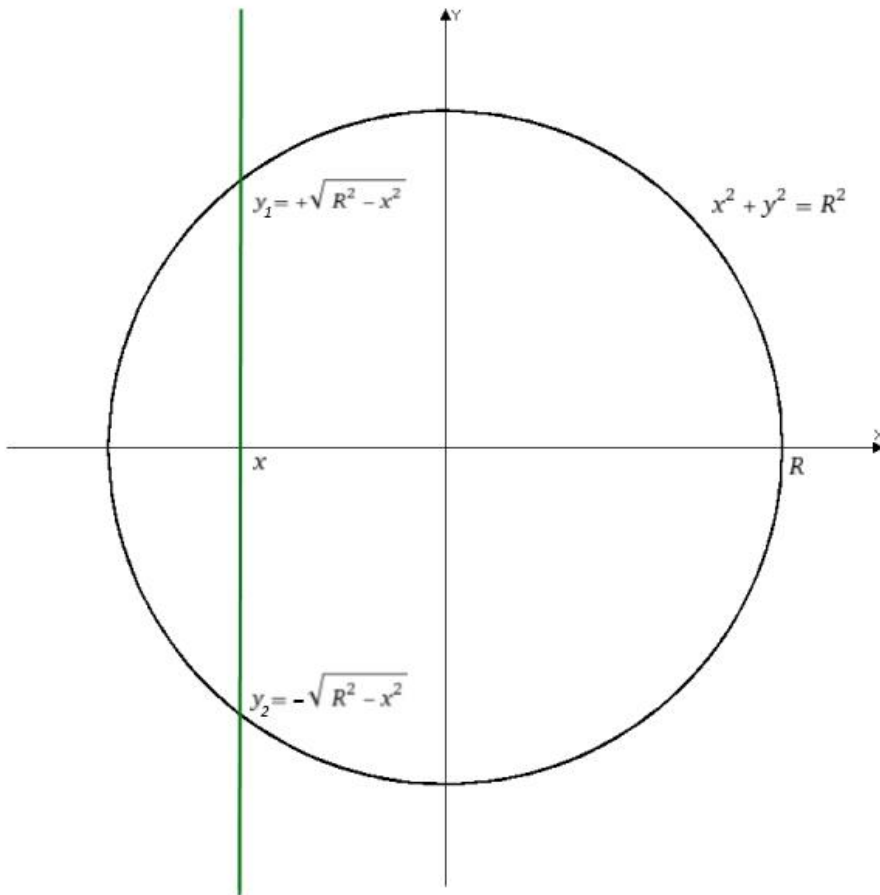


Question

Circle is not a function. Why? Explain Geometrically.



Solution

Definition of a Function: «A function is a relation for which each value from the set the first components of the ordered pairs (i.e. x) is associated with exactly one value from the set of second components of the ordered pair (i.e. y)».

A function is a rule that assigns uniquely to a member of domain set, a member of the image set. The key word is "uniquely". Therefore, if you got two values y_1 and y_2 for one x , then you have a rule, but not a function. That is the logic behind the vertical line test. If you draw a vertical line and it intersects the graph of the curve in two distinct points, then that is not a function.

An example of this is the circle $x^2 + y^2 = R^2$.

Solving this equation with respect to y we have two roots: $y_1 = +\sqrt{R^2 - x^2}$ and $y_2 = -\sqrt{R^2 - x^2}$. Thus, the vertical line test (one value of x) gives us two points of intersection (two values of y), so a circle is not a function.