Calculus 1.4 CW

What does $f\left(x\right)=x^{2}$ mean?

$f(x)$ is the same thing as $y.$

$x$ is the independent variable

$y$ is the dependent variable

A function is a relationship between two variables such that to each value of the independent variable there corresponds exactly on value of the dependent variable.

What does this mean?

Every $y$ has only one $x$ coordinate. OR All the $x$’s are different.

Is this a function?

$x+y=1 y=-x+1$ This is a linear function. There is only one y value for each x.

$x^{2}+y^{2}=1 y^{2}=1-x^{2} y=\pm \sqrt{1-x^{2}}$ This is not a function as there are two y values for every x.

$x^{2}+y=1 y=x^{2}+1$ This is a function as there is only one y value for every x.

$x+y^{2}=1 y^{2}=1-x y=\pm \sqrt{1-x}$ This is not a function as there are two y values for every x .

Vertical line test

Use the vertical line test to verify if these are functions or not.

  Not a function.

 

 Not a function.

 

Domain and Range of the Function

The domain is the x coordinate.

The range is the y coordinate.

What is the domain of each function?

 Square roots The function under the square root > 0

 $f\left(x\right)=\sqrt{x-3}$

 $f\left(x\right)=\sqrt{16-x^{2}}$

 Denominators

 $f\left(x\right)=\frac{1}{x}$

 $f\left(x\right)=\frac{(x-2)}{\left(x-2\right)\left(x+3\right)^{2}}$

 Square roots in the denominator

 $f\left(x\right)=\frac{1}{\sqrt{x-5}}$

 $f\left(x\right)=\frac{3x-2}{(x+4)\sqrt{x^{2}-4}}$

Piecewise Functions

 $f\left(x\right)=\left\{\begin{array}{c}x+3 x<0\\x^{2} x\geq 0\end{array}\right.$

 There are two pieces to this graph.

One piece is every $x$ value to the right of 0.

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One-to-One Function

A function is one-to-one if it has an inverse. You can check to see if it is one-to-one by using the horizontal line test.

Evaluating a Function:

 $f\left(x\right)=2x^{2}-4x+1$

 $f\left(-1\right)=$

 $f\left(0\right)=$

 $f\left(2\right)=$

Is this function one-to-one?

 $f\left(x\right)=x^{2}+7$

 $f\left(x+3\right)=$

 $f\left(x+∆x\right)=$

 $\frac{f\left(x+∆x\right)-f(x)}{∆x}=$

Definition of a Composite Function

 $\left(f∘g\right)\left(x\right)=f(g\left(x\right))$

 $f\left(x\right)=x-4$ $g\left(x\right)=x^{2}$

 $f\left(g\left(2\right)\right)=$ $g\left(f\left(2\right)\right)=$

 $f\left(g\left(x\right)\right)=$

 $g\left(f\left(x\right)\right)=$

Inverse Functions

 $g\left(x\right)$ is the inverse function of $f(x)$ if

Find the inverse function.

 Steps:

1. Switch the variables.
2. Solve for $y.$

 $f\left(x\right)=2x-1$

 $f\left(x\right)=\frac{2x-3}{4x+1}$

 $f\left(x\right)=x^{2}-1$