

Math 201

Section 1.5 Continuity

Definition A function f is continuous at a number c if each of the following conditions are satisfied:

1. $f(c)$ is defined.
2. $\lim_{x \rightarrow c} f(x)$ exists.
3. $\lim_{x \rightarrow c} f(x) = f(c)$.

Properties of Continuous Functions

If the functions f and g are continuous at c , then

1. $f + g$ is continuous at c ;
2. $f - g$ is continuous at c ;
3. fg is continuous at c ;
4. $\frac{f}{g}$ is continuous at c if $g(c) \neq 0$.

A polynomial is continuous everywhere and a rational function is continuous at every point where the denominator is nonzero.

If the function g is continuous at c , and the function f is continuous at $g(c)$, then the composition $f \circ g$ is continuous at c .

Intermediate Value Theorem (IVT) Suppose that f is continuous on the closed interval $[a, b]$ and let N be any number between $f(a)$ and $f(b)$, where $f(a) \neq f(b)$. Then there exists a number c in (a, b) such that $f(c) = N$.