Geometry

Algebra

The Fundamental Theorem of Algebra

If a function $f(x)$ is a polynomial, i.e. $f(x) = \sum_{k=0}^{n} c_k x^k$ where $c \in \mathbb{C}$ then there exists $r_k \in \mathbb{C}$ such that $f(r_k) = 0$

Calculus

The Squeeze Theorem

For any function $f(x)$ continuous on $[a, b]$ where the also exist functions $g(x)$ and $h(x)$ such that $h(x) \leq f(x) \leq g(x) \forall x \in [a, b]$, if $f(x)$ is discontinuous at point $c \in [a, b]$ and $\lim_{x \to c} g(x) = \lim_{x \to c} h(x) = L$, then $\lim_{x \to c} f(x) = L$

The Differential Mean Value Theorem

For any continuous function $f(x)$ that is defined on $[a, b]$ and differentiable on (a, b) where $b > a$ then there exists $c \in (a, b)$ such that $\frac{d}{dx} f(c) = \frac{f(b) - f(a)}{b - a}$

The Integral Mean Value Theorem

For any continuous function $f(x)$ that is defined on $[a, b]$ where $b > a$ then there exists $c \in (a, b)$ such that $f(c) = \frac{\int_a^b f(x) dx}{b - a}$