1 Ordinary Differential Equations

Theorem 1.1 (Existence and Uniqueness)**.** *Let R be a region on the plane xy defined as $a \leq x \leq b$, $c \leq y \leq d$ which contains a point (x_0, y_0) inside. If $f(x, y)$ and $\frac{df}{dy}$ are continuous on R, then, exists some interval $I_0 : (x_0 - h, x_0 + h)$, $h > 0$ contained on $[a, b]$ and a unique function $y(x)$, defined on I_0 that is a solution to the Cauchy problem(Initial value problem).*