Calculus - Chapter 13 - Mean, Increasing, Decreasing Functions.

Relative max: $f(x)$ has a relative maximum at x_0 if $f(x_0) \geq f(x)$ $\forall x$ in some open interval containing x_0.

Relative min: $f(x)$ has a relative minimum at x_0 if $f(x_0) \leq f(x)$ $\forall x$ is some interval containing x_0.

Rolle's Theorem: Let $f(x)$ be continuous on the closed interval $[a,b]$ and differentiable on the open interval (a,b). Assume that $f(a) = f(b) = 0$. Then $f'(x_0) = 0$ for at least one point x_0 in (a,b).

Law of Mean: Let $f(x)$ be continuous on the closed interval $[a,b]$ and differentiable on the open interval (a,b). Then there is at least one point x_0 in (a,b) for which

$$\frac{f(b) - f(a)}{b-a} = f'(x_0).$$

Increasing / Decreasing Function: A function $f(x)$ is said to be increasing on an interval if $u < v$ implies $f(u) > f(v)$ for all u and v in the interval. Similarly, $f(x)$ is said to be decreasing on an interval if $u < v$ implies $f(u) < f(v)$ for all u and v in the interval.

If $f'(x)$ is positive on interval, it is increasing, similarly for decreasing.