Theorem (Extreme Value Theorem)**.** *If f is continuous on a closed interval $[a, b]$, then f attains both an absolute maximum value M and an absolute minimum value m in $[a.b]$. That is, there are numbers x_1 and x_2 in $[a, b]$ with $f(x_1) = m$, $f(x_2) = M$, and $m \leq f(x) \leq M$ for every other x in $[a, b]$.*

a) Draw a graph of a function that satisfies the hypotheses of the Extreme Value Theorem.

b) Draw a graph of a function that satisfies the results of the Extreme Value Theorem.

c) Draw a graph of a function that satisfies the results of the Extreme Value Theorem but not it's hypotheses.

Theorem. *Rolle's Theorem Suppose that $y = f(x)$ is continuous over the closed interval $[a, b]$ and differentiable at every point of its interior (a, b). If $f(a) = f(b)$, then there is at least one number c in (a, b) at which $f'(c) = 0$.*

a) Draw a graph of a function that satisfies the hypotheses of Rolle's Theorem.

b) Draw a graph of a function that satisfies the results of Rolle's Theorem.

c) Draw a graph of a function that satisfies the results of Rolle's Theorem but not it's hypotheses.

Theorem. *Mean Value Theorem Suppose $y = f(x)$ is continuous over a closed interval $[a, b]$ and differentiable on the interval's interior (a, b). Then there is at least one point c in (a, b) at which*

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

a) Draw a graph of a function that satisfies the hypotheses of the Mean Value Theorem

b) Draw a graph of a function that satisfies the results of the Mean Value Theorem

c) Draw a graph of a function that satisfies the results of the Mean Value Theorem but not it's hypotheses.