Mean Value Theorem (MVT)

Suppose $f$ is a function defined on some closed interval $[a, b]$ such that

(i) $f$ is continuous on $[a, b]$

(ii) $f$ is differentiable on $(a, b)$

Then there is a real number $c$ in $(a, b)$ such that

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

**IDEA:**

The diagram illustrates the Mean Value Theorem. The slope of the line segment $AB$ between $A$ and $B$ is equal to the average rate of change of $f(x)$ from $a$ to $b$, which is $f'(c)$. The slope of the tangent line at any point $x = c_1$, $x = c_2$, etc., is $f'(c_1)$, $f'(c_2)$, etc., for various points $c_1, c_2, ...$.