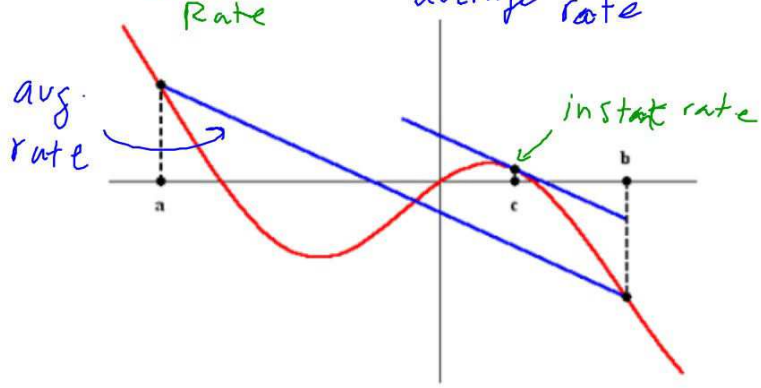
Mean Value Theorem

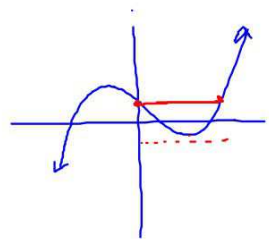
If $f(x)$ is continuous on [a,b] and differentiable on (a,b), then there exists some c in (a,b) such that

$$\underbrace{f'(c)}_{\text{Instant Rate}} = \underbrace{\frac{f(b)-f(a)}{b-a}}_{\text{average rate}}$$



Find the value of c guaranteed to exist by the MVT
$f(x)=x^3-2x^2+2$ on [0,2]

. $f(x)$ polynomial $\longrightarrow$ diff.



① Average Rate.

$$\frac{f(b)-f(a)}{b-a} = \frac{f(2)-f(0)}{2-0} = \frac{2-2}{2} = \frac{0}{2} = 0$$

② Instant Rate

$f'(x) = 3x^2 - 4x$

MVT

$3x^2 - 4x = 0$

$x(3x-4) = 0$

$\cancel{x=0}$ not in $(0,2)$

$x = \frac{4}{3}$