AD1

What is Rolle's Theorem?

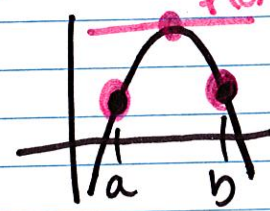
If 1. f is continuous on $[a,b]$

2. f is differentiable on (a,b)

3. $f(a)=f(b)$ same y-value

Then $\underbrace{f'(c)=0}_{\text{max/or min on }(a,b)}$ on (a,b)

$f'(c)=0$



AD2

Given $f(x)=x^2-3x+2$ on the interval $[1,2]$ Use Rolle's Theorem.

Given $f(x)=x^2-3x+2$ on $[1,2]$
Use Rolle's Theorem

If 1. f is continuous $[1,2]$

2. f is differentiable $(1,2)$

3. $f(1)=f(2)=0$ } same y-value

$f(1)=(1)^2-3(1)+2=0$

$f(2)=(2)^2-3(2)+2=0$

Then

$f'(x)=0$ on $(1,2)$

$2x-3=0$

$x=\frac{3}{2}=1.5$

$\boxed{x=1.5}$ } max or min

AD3

What is the mean value theorem?

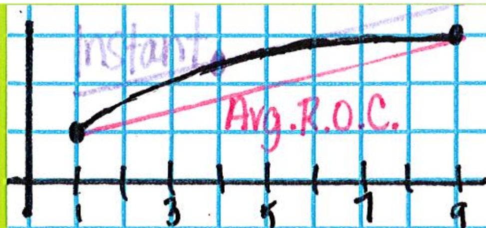
If $\boxed{1.}$ f is continuous on $[a,b]$

$\boxed{2.}$ f is differentiable on (a,b)

Then $\dfrac{f(b)-f(a)}{b-a}=f'(c)$ where c is on $[a,b]$

Avg. R.O.C = Instant R.O.C

Use Mean Value Theorem for $f(x)=\sqrt{x}$ $[1,9]$



$f(x)=\sqrt{x}$ on $[1,9]$

$\boxed{1.}$ f is continuous $[1,9]$

$\boxed{2.}$ f is differentiable $(1,9)$

Then $\dfrac{f(9)-f(1)}{9-1} = f'(x)$

Average R.O.C = Instant R.O.C

$$\frac{3-1}{8} = \frac{1}{2\sqrt{x}}$$

$$\frac{1}{4} = \frac{1}{2\sqrt{x}}$$

$$2\sqrt{x} = 4$$

$$\sqrt{x} = 2$$

$$\boxed{x=4}$$