ROLLE'S THEOREM

Let f be continuous on closed interval $[A,B]$ and differentiable on an open interval (A,B). If $f(a)=f(b)$, then there is at least one number "c" in (A,B) such that $f'(c)=0$.

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

Show that $f'(c)=0$ at some point between the two x-intercepts.

$x^2-3x+2=0$

$(x-2)(x-1)=0$

$f(1)=0$, $f(2)=0$ → $x=2$, $x=1$ → interval $(1,2)$

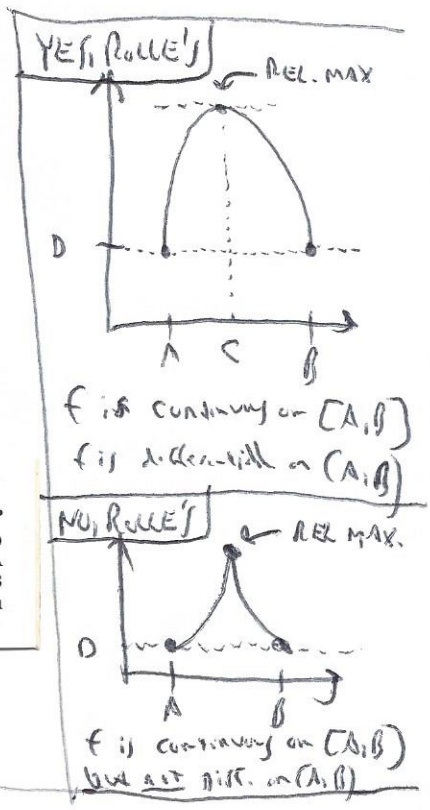
$f'(x)=2x-3$

$2x-3=0$

$2x=3$

$x=\frac{3}{2}=1.5$ ← between 1 & 2!

$f'(1.5)=0$ ✓ $c=1.5$



The Happy/Fun Math Tutor
2901 Clint Moore Road #319
Boca Raton, FL 33496 USA
(561) 459-2058
HappyFunMathTutor@gmail.com

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

Find the value(s) of c in the interval $(-2,2)$ such that $f'(c)=0$

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

$4x^3-4x=0$

$4x(x^2-1)=0$

$4x(x+1)(x-1)=0$

$x=0,-1,1$ ← between -2 & 2!

$f(-2)=8$

$f(2)=8$

$f'(0)=0$

$f'(-1)=0$

$f'(1)=0$

$c=-1,0,1$ ✓