Notes 16 **Name _____**

Rolle's Theorem and The Mean Value Theorem (4.3)

Rolle's Theorem
Let f be a function that satisfies the following three hypotheses:
1. f is continuous on the closed interval $[a,b]$
2. f is differentiable on the open interval (a,b)
3. $f(a) = f(b)$
Then there is a number c in (a,b) such that $f'(c) = 0$

*Verify that the function satisfies the three hypotheses of **Rolle's Theorem** on the given interval. Then find all numbers c that satisfy the conclusion of **Rolle's Theorem**.*

1. $f(x) = 2x^3 - 2x + 1 \qquad [-1,1]$

2. $f(x) = 2x\sqrt{x+4} \qquad [-8,-4]$

$f(x) = 2x\sqrt{x+4} \qquad [-4,0]$

Mean Value Theorem

Let f be a function that satisfies the following hypotheses:

1. f is continuous on the closed interval $[a,b]$
2. f is differentiable on the open interval (a,b)

Then there is a number c in (a,b) such that $f'(c)=\dfrac{f(b)-f(a)}{b-a}$

*Verify that the function satisfies the hypotheses of the **Mean Value Theorem** on the given interval. Then, find all numbers c that satisfy the conclusion of the **Mean Value Theorem**.*

3. $f(x)=2x^3-5x^2+1 \qquad [0,2]$

4. $f(x)=\dfrac{2x}{x-2} \qquad [0,4]$

$f(x)=\dfrac{2x}{x-2} \qquad [3,6]$