Notes 58 **Name _____**

The Mean Value Theorem (4.3)

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**.*

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

2. $f(x)=2x\sqrt{x+4} \qquad [-8,-4]$ $\qquad f(x)=2x\sqrt{x+4} \qquad [-4,0]$

3. $f(x)=\dfrac{2x}{x-2} \qquad [0,4]$ $\qquad f(x)=\dfrac{2x}{x-2} \qquad [3,6]$

Use the First Derivative Test to find the critical points and the intervals on which the function is increasing/decreasing.

4. $f(\theta) = \theta - 2\cos\theta \qquad [0, 2\pi]$

5. $f(x) = \dfrac{x^3}{x^2 - 3}$

5. $f(x) = x^{5/2} - x^2 \qquad (0, \infty)$