Math 1496 Calc 1 - Homework #6

Pg. 211, #15, 17, 19, 21, 29, 30 and 33

Pg. 219, #43, 45 and 47

Pg. 227, #23, 27, 29 and 41

Pg. 236, #3, 5, 15, 19, 29, 39 and 43

Pg. 211, #15, 17, 19, 21

Find the critical numbers (points) of the following

$$\text{\#15} \quad f(x) = 4x^2 - 6x$$

$$\text{\#17} \quad g(t) = t\sqrt{4 - t}, \ t < 3$$

$$\text{\#19} \quad h(x) = \sin^2 x + \cos x, \ 0 < x < \pi$$

$$\text{\#21} \quad f(f) = te^{-2t},$$

Pg. 211, #29, 30, 33

Find the absolute extrema of the function on the closed interval

$$\text{\#29} \quad f(x) = x^3 - \frac{3}{2}x^2, \ [-1, 2]$$

$$\text{\#30} \quad f(x) = 2x^3 - 6x, \ [0, 3]$$

$$\text{\#33} \quad g(x) = \frac{6x^2}{x - 2}, \ [-2, 1]$$

Pg. 219, #43, 45 and 47

Determine whether the Mean Value Theorem applieds and if so, find c such that

$$\frac{f(b) - f(a)}{b - a} = f'(c)$$

$$\text{\#43} \quad f(x) = 6x^3, \ [1, 2]$$

$$\text{\#45} \quad f(x) = x^3 + 2x, \ [-1, 1]$$

$$\text{\#47} \quad f(x) = \frac{x + 2}{x - 1}, \ [-3, 3]$$

Pg. 227, #23, 27, 29 and 41

Find the critical numbers of f, and find the open intervals on which the function is increasing or decreasing. Apply the first derivative test to identify all relative extrema.

$$\text{\#23} \quad f(x) = x^2 - 8x$$

$$\text{\#27} \quad f(x) = -7x^3 + 21x + 3$$

$$\text{\#31} \quad f(x) = (x - 1)^2(x + 3)$$

$$\text{\#41} \quad f(x) = \frac{x^2}{x^2 - 9}$$

Pg. 236, #3, 5, 15, 19 and 29

Find the points of inflection and discuss the concavity of the following

$$\#3 \quad f(x) = x^2 - 4x + 8$$

$$\#5 \quad f(x) = x^4 - 3x^3$$

$$\#15 \quad f(x) = x^3 - 9x^2 + 24x - 18$$

$$\#19 \quad f(x) = x(x-4)^3$$

$$\#29 \quad f(x) = 2\sin x + \sin 2x, \quad [0, 2\pi]$$

Pg. 236, #39 and 43

Find all relativ e extrema and use the second derivative test to determine min/max.

$$\#39 \quad f(x) = (x-1)^2(x+3)$$

$$\#43 \quad f(x) = (x-1)^2(x+3)$$

Due: Friday Oct. 8, 2021