Calculus I Notes

Name __________________________ Date: ____________

Warm-up: If you can't do this, you will be in trouble!

ex 1 - **Factor** using p/q’s: \( f(x) = 2x^4 + 7x^3 - 12x^2 - 28x + 16 \)

**Mean Value Theorem** (for derivatives)

If \( f(x) \) is continuous on \([a,b]\) and differentiable on \((a,b)\), then there exists

at least one number \( c \) on \((a,b)\) such that \( f'(c) = \frac{f(b) - f(a)}{b - a} \).

ex 2 - If \( f(x) = x^3 - x^2 - 2x \) on \([-1,1]\), find the \( c \)-value guaranteed by Mean Value Theorem, or explain why Mean Value Theorem does not apply.

ex 3 - If \( f(x) = \frac{x}{x+1} \) on \( [-\frac{1}{2}, 2] \), find the \( c \)-value guaranteed by Mean Value Theorem, or explain why Mean Value Theorem does not apply.
Rolle’s Theorem

If \( f(x) \) is continuous on \([a,b]\) and differentiable on \((a,b)\) and if \( f(a) = f(b) \), then there exists at least one number \( c \) on \((a,b)\) such that \( f'(c) = 0 \).

ex 4 - If \( f(x) = x^4 - 2x^2 \) on \([-2,2]\), find the \( c \)-value guaranteed by Rolle’s Theorem, or explain why Rolle’s Theorem does not apply.

ex 5 - If \( f(x) = 3 - |x - 3| \) on \([0,6]\), find the \( c \)-value guaranteed by Rolle’s Theorem, or explain why Rolle’s Theorem does not apply.

due Mon, Dec 9 - A.51 below