MATH 241, Fall 2008 Final Exam: December 12

NAME				
INSTRU	JCTOR			

Arrange your work as clearly and neatly as possible, and cross out incorrect work. **Unless otherwise noted, you must justify all answers and show work to receive full credit.** You may not use calculators, notes, or any other kinds of aids.

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Total	



"Just a darn minute! — Yesterday you said that X equals **two**!"

1. Evaluate $\lim_{x \to \infty} \frac{3x^4 - 2x^2}{x^4 + 5}$.

2. Find the value of *c* that makes this function continuous at x = -3.

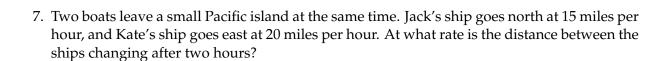
$$f(x) = \begin{cases} \frac{x^2 - 9}{x + 3}, & x < -3\\ cx + 2, & x \ge -3 \end{cases}$$

3. Differentiate $(\tan x)(x^{-1} + e^x)$. (No need to simplify the result.)

4. Find $\frac{d}{dx} \left[\frac{x + \sin x}{1 + 10^x} \right]$. (No need to simplify.)

5. Find y', if $y = [\ln(x^2 + 1)]^5$.

6. Find the tangent line at $\left(\frac{\pi}{2}, \frac{\pi}{2}\right)$ for the curve defined by $x \sin y = y \sin x$.

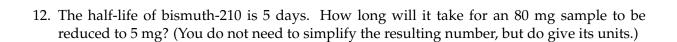


8. Find the linearization of $y = \sqrt{x+1}$ at a = 0.

9. Suppose $y = 2e^{-x} - e^{-2x}$. Find	d (or write NONE):	
(a) intervals of increase	and decrease	
(b) intervals of concavity up _	and concavity down	

10. Find the absolute (global) min and absolute (global) max values of $x^3 - 3x + 1$ on $[-3, 0]$.

11. A farmer wants to use 400 m of fencing to make three sides of a rectangle adjoining a river, which will act as the fourth side. What is the maximum area she can enclose?



13. Find the most general antiderivative of $f(x) = 2e^x + \frac{1}{x}$ for x > 0.

14. Evaluate
$$\int \frac{x^3}{\sqrt[3]{x^4 + 5}} dx.$$

15. Evaluate
$$\int_0^{\pi} (\cos x + \sin 2x) \ dx.$$