MTH 162 Sec H8, Spring 2014: Sample Midterm 1

Student Name ________________  Student ID ________________

UNIVERSITY OF MIAMI HONOR CODE PLEDGE

I have neither given nor received unauthorized aid on this piece of work, and I understand and will uphold the ideals of academic honesty as stated in the Honor Code of the University of Miami.

Signature ____________________
Total: 30 pts (=15% of the final grade)  
Time allowed: 50 minutes.

You are not allowed to use any electronic devices, such as calculators, laptops or phones, during the test. Please show your steps clearly.

1. (10 pts) Let \( f(x) = \sqrt{x - 2} \), defined on \([2, \infty)\).

   (a) (3 pts) Find the inverse of \( f \).
   (b) (3 pts) Find \( f^{-1}(2) \).
   (c) (4 pts) Compute \( (f^{-1})'(2) \).
2. (10 pts)

(a) (2 pts) Compute $\int \frac{1}{x} \, dx$ and $\int 7^x \, dx$.

(b) (4 pts) Expand the quantity $\ln \sqrt{\frac{x+1}{(x-1)^2}}$.

(c) (4 pts) Use logarithmic differentiation to find the derivative of $\frac{x+1}{(x-1)^2}$. (Your answer must be exact and fully simplified.)
3. (10 pts)

(a) (3 pts) Differentiate the function \( f(x) = e^{x^2+1} \).

(b) (3 pts) Compute \( \int \frac{e^{\frac{1}{x}}}{x^2} \, dx \).

(c) (4 pts) Compute \( \frac{d}{dx} (x^\sin x) \).