**MA 125 CV, CALCULUS I**
Test 4, November 20, 2014

Name (Print last name first): .....

**Show all your work and justify your answer!**

**No partial credit will be given for the answer only!**

**PART I**

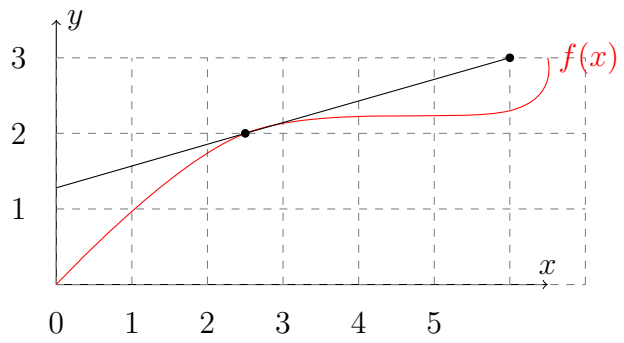
**You must simplify your answer when possible.**
**All problems in Part I are 8 points each.**

1. Given the graph of the function $y = f(x)$ below, estimate

   (a) $f(2)$,

   (b) $f^{-1}(2)$,

   (c) $(f^{-1})'(2)$.



2. If $f(x) = \ln(x^3 + 1)$, find $f'(x)$

3. If $f(x) = xe^{x^2}$, find all critical numbers of $f(x)$ (if any).

4. Evaluate $\displaystyle\int \frac{x^2}{e^{x^3}}\, dx$

5. Solve $e^{2x+1} = 7$

6. Solve $\ln(2x + 1) = 7$,

7. Let $f(x) = e^x + x - 7 = 0$, find two consecutive integers (i.e., find $n$) so that $f(n) < 0$ and $f(n + 1) > 0$. Conclude that there exists a root between $n$ and $n + 1$. Use Newton's method, with $x_0 = \frac{2n+1}{2}$ to compute the next approximate solution $x_1$.

**PART II**

1. **[12 points]** Evaluate $\displaystyle\int \frac{e^{1/x}}{x^2}\,dx$

2. **[12 points]** Evaluate $\displaystyle\int_{-5}^{-e} \frac{dx}{x\ln(|x|)}$.

3. **[20 points]** Graph the function $y = f(x) = xe^x$. Label all $x$ and $y$ intercepts, asymptotes and local/absolute max/min if any. [Hint: use your calculator to estimate $\lim_{x\to-\infty} xe^x$ by making a table of values; $x = -5$, $x = -10$ and $x = -20$ should suffice.] Does $f(x)$ have a point of inflection and, if so, what is it?