MA 125 CV, CALCULUS I
Test 4, April 9, 2015

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

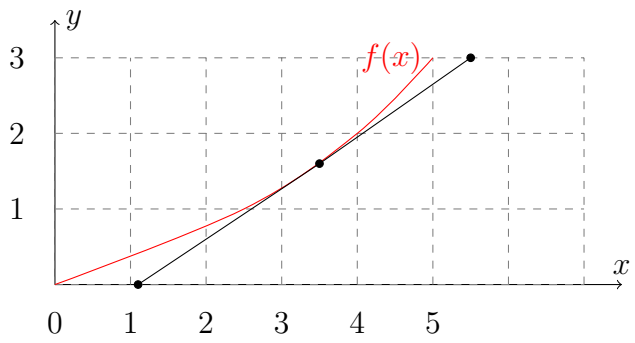
You must simplify your answer when possible.
All problems in Part I are 8 points each.

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

   (a) $f(2)$,

   (b) $f^{-1}(1.6)$,

   (c) $(f^{-1})'(1.6)$.



2. If $f(x) = \ln(\sin(x))$, find $f'(x)$

3. If $f(x) = e^{x^2-5x}$, find all critical numbers of $f(x)$ (if any).

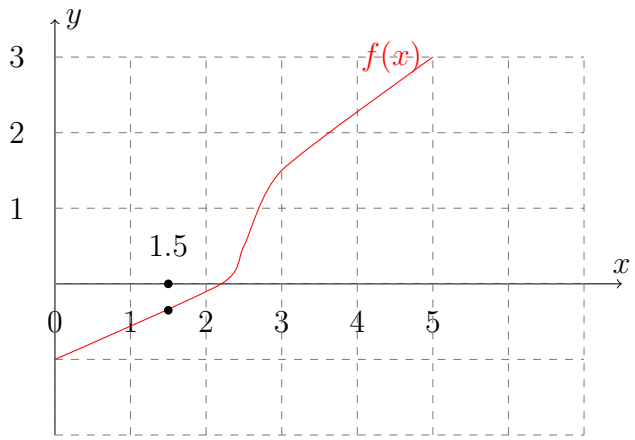
4. Evaluate $\displaystyle\int \frac{\ln(x)}{x}\,dx$

5. Solve $e^{1-x} = 10$

6. Solve $\ln(1 - x) = 10$,

7. Let $f(x) = x^5 + x - 7 = 0$. Compute the second approximate solution, using Newton's method, if the first approximate solution is $x_1 = 1.2$.

8. Use the graph below to draw the location of second approximate solution given that the first approximate solution $x_1 = 1.5$ as indicated. Label the value of x_2 in the picture.



PART II

1. **[12 points]** Evaluate $\displaystyle\int \frac{[\ln(x)]^5 + [\ln(x)]^3}{x}\,dx$

2. **[12 points]** Evaluate $\displaystyle\int e^{5\ln(x)}\,dx$. (Hint: simplify the function before integrating.)

3. **[12 points]** Find the **absolute** Max and Min of the function $f(x) = x\ln(x)$ on the interval $[\frac{1}{2}, 3]$.