Honors Analysis

Name _____

Copy the original problem.
Convince *me* that **you** understand the concept.
No calculators, of course.

Per _____ Date _____

LAST REGULAR EXAM

I Given: $f(x) = \dfrac{x}{\ln x}$ (tot 30 pts)

a) Find the domain of $f(x)$
b) Find the interval(s) where $f(x)$ is increasing.
c) Find and identify the *coordinates* of all extrema.
d) Find the interval(s) where $f(x)$ is concave down.
e) What is the range of $f(x)$.
f) Based on sections "a" through "d", sketch $f(x)$.

II Given $f(x)$, find $f'(x)$: (5 pts ea)

a) $f(x) = \sin\ e^{-2x}$ b) $f(x) = \ln(\tan x)$

c) $f(x) = e^{x^e}$ d) $f(x) = \dfrac{1}{\ln x}$

III Find the integral : (5 pts ea)

a) $\displaystyle\int \frac{(2x+3)^3}{x}\ dx$ b) $\displaystyle\int e^{-kx}\ dx$

IV Simplify using the "Mumaugh" tables: (5 pts ea)

a) ln 40 b) $\log_3 8$ c) ln (2.4) d) $(\log_5 2)(\log_2 25)$

V Given $e^y = x$. Find the first derivative of *y* with respect to *x*. (10 pts)

VI Find the *x*-intercept of the line tangent to $f(x) = \ln x$ which has slope e^2. (10 pts)

Extra Credit 5 pts

Given: $f(x) = \ln(\cos^2 x - \sin^2 x)$, find $f'\left(\dfrac{\pi}{8}\right)$.