Honors Analysis Name _____

Copy original problem. Per _____ Date _____

Convince *me* that **you** understand the concept***!***

No Calculators!

Last Regular Exam

I Given y, find $\frac{dy}{dx}$.

Final answers are to be fully factored, single fractions (if any) and to have no negative exponents.

(60 pts tot)

a) $y = x^{e^x}$ b) $y = x^{x^e}$ c) $y = e^{x^e}$ d) $y = e^{e^e}$

e) $y = e^{e^x}$ f) $y = \log_{10} x^e$ g) $y = \log_{10} e^x$

II Determine the coordinates of significant points. Sketch. Justify.

$$f(x) = x e^x; \quad D_f \quad x \ \varepsilon \ [-3, e]$$ (15 pts)

III Given: 1) $f(x) = \cos x$ for $0 \le x \le 2\pi$

2) $g(x) = \ln x$ for $x > 0$

3) $S(x) = g(f(x))$ (25 pts tot)

a) Find the Domain of $S(x)$.

b) Find the Range of $S(x)$.

c) Find the zeros of $S(x)$.

d) Find the slope of the line tangent to the graph of $S(x)$ at $x = \frac{\pi}{3}$

Extra Credit ---------- 5 pts ----------

Evaluate: $\int_0^2 (2x-1)^4 \, dx$