Differential Eqns MAP2302 3145 **P-Prereq** Prof. JLF King 10Sep2015

Please. Use "$f(x)$ notation" when writing fncs; in particular, for trig and log fncs. E.g, write "$\sin(x)$" rather than the horrible $\sin x$ or $[\sin x]$. Do ***not*** approx.: If your result is "$\sin(\sqrt{\pi})$" then write that rather than .9797$\cdots$. Write expressions unambiguously e.g, "$1/a+b$" should be bracketed either $[1/a]+b$ or $1/[a+b]$. (Be careful with **negative** signs!)

Please write **DNE** in a blank if the described object does not exist or if the indicated operation cannot be performed.

P1: Show no work.

z What is a polar bear? Answer:
A rectangular bear after a coordinate transform.

a The **slope** of line $3[y-5]=2[x-1]$ is ____. Point $(4,y)$ lies on this line, where $y=$ ____.

b The solutions to $3z^2=1-z$ are $z=$ ____.

c $\left[\sqrt{3}^{\sqrt{2}}\right]^{\sqrt{8}}=$ ____. $\log_8(4)=$ ____.

d Let $B(x):=x^x$. Its derivative, then, is $B'(x)=$ ____.
[*Hint:* How is x^x defined ITOf the exponential fnc?]

e For fnc $y=h(x):=\left[5+\sqrt[3]{x}\right]/2$, its inverse fnc is $h^{-1}(y)=$ ____.

f Suppose g is a fnc with g' never zero. Let h be the inverse fnc of g. In terms of h, g and g', write a formula for $h'(x)=$ ____.
[*Hint:* The Chain rule.]

f* Let $g(x):=x^3+x$. Then $g^{-1}(10)=$ ____ and $[g^{-1}]'(10)=$ ____.

g Compute the sum of this geometric series: $\sum_{n=0}^{\infty}[-1]^n\cdot[3/5]^n=$ ____.

h The series $\sum_{k=1}^{\infty}\frac{[-1]^k}{\ln(k)}$ (circle one): Diverges, Converges absolutely, Converges conditionally.

i The **radius of convergence** of power series $\sum_{n=0}^{\infty}\frac{[3x]^n}{n+7}$ is: RoC=____.

End of P-Prereq

P1: ___ ___ ___ 110pts

Total: ___ ___ ___ 110pts

Print name ____ Ord:

HONOR CODE: *"I have neither requested nor received help on this exam other than from my professor."*

Signature: ____