Math 121 Fall 2011 Exam 2 Prof Doyle

Read and follow the following directions.

1. Write your name, your TA's name, and your Tu/Th discussion time in the box on the front of the answer booklet.
2. SIGN your name in the box on the front of the answer booklet.
3. ALL WORK MUST BE SHOWN in the booklet for full credit.
4. There is NO SHARING OF CALCULATORS; forfeiture of exam is the penalty.
5. Keep your eyes on your own paper, cheating will be dealt with severely.
6. Place your exam question sheet INSIDE the booklet when you hand in your exam TO YOUR TA.

1. a) Find the Inverse function to: $f(x) = \dfrac{2x+3}{x-3}$ 10pts

b) Name in INTERVAL NOTATION, the Domain and Range of each, $f(x)$ *and* $f^{-1}(x)$ 4pts

2. Use properties of logarithms to perform the requested conversion, showing ALL WORK: 8pts each

a) $\log_5\left(\dfrac{x^4}{y^7\sqrt[6]{z}}\right)$, as two or more log's with NO exponents

b) $5\ln(2x+3)+3\ln(x-1)-4\ln x$, as a single logarithm

3. Solve the equations for all VALID solutions, showing answers in **EXACT FORM(No Decimals**)

a) $4^{x+2}\cdot 2^x = 64$ b) $\log_6(x+2) = 2-\log_6(7+x)$ 8pts each

4. The half-life of a newly discovered radioactive isotope is 8.6 years, and it follows the Law of Uninhibited Decay, $P(t) = P_0e^{kt}$, $k<0$ 15pts

a) Use this information to determine k, **rounded to 4 places behind the decimal**

A secret government lab "accidentally" spills 250g. Determine:

b) how much of the 250g is left after 20 years?

c) how many years(to the nearest 0.1) until there is only 25g left?

5. A lawn sprinkler sprays water from its spout all along the way to 32 feet out. The sprinkler cycles through a turn of 195^o. How many square feet of lawn is sprinkled? SHOW WORK.

(Hint: possible useful formulas: $s = r\theta$, $A = \dfrac{1}{2}r^2\theta$ 8pts

6. Given the following information, determine the **EXACT VALUE** of the remaining 5 Trig functions **Denominators DO NOT need to be rationalized**.

$\csc\theta = \dfrac{5}{2}$ *and* $\tan\theta < 0$ 15pts

7. Given $y = -6\sin\left(2x+\dfrac{3\pi}{2}\right)$, find: 16pts

a) the Period b) the Amplitude c) the Phase Shift

d) a Sketch of **2 full periods**, starting at YOUR PHASE SHIFT, **where the x-axis is in RADIANS and all important x-values are CLEARLY marked along the axis**