MATH 2260
Midterm Exam III – Alternate
April 23, 2013

NAME (please print legibly): _____________________________________________
Your University ID Number: ____________________________________________

Please complete all questions in the space provided. Draw a box around your final answer. You
may use the backs of the pages for extra space, or ask me for more paper if needed. Work carefully,
and neatly (part of your grade will be based on how well your work is presented).

Try to complete the problems you find easier before going back to the harder ones. Good luck!

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>VALUE</th>
<th>SCORE</th>
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<td>TOTAL</td>
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1. (10 points) Find the limit of the sequence

\[ \lim_{n \to \infty} \frac{\ln n^2}{n} \]

2. (10 points) Does the series

\[ \sum_{n=0}^{\infty} \frac{\ln n}{\ln(\ln n)} \]

converge or diverge? Use any test you like.
3. **(10 points)** Does the series
\[
\sum_{n=1}^{\infty} \frac{(-3)^n}{n!}
\]
converge or diverge? Use any test you like.

4. **(10 points)** Consider the power series
\[
\sum_{n=1}^{\infty} \frac{n + 1}{2n + 1} \frac{(x + 1)^n}{2^n}.
\]
What is the center of the power series? What is the radius of convergence? (To save time, you can skip checking convergence at the endpoints of the interval.)
5. (10 points) For which values of $x$ does the series
\[
\sum_{n=1}^{\infty} \frac{(x - 1)^{2n-2}}{(2n - 1)!}.
\]
converge or diverge? Use any test you like.

6. (10 points) Find the value of the convergent series
\[
\sum (-1)^n \frac{3}{4^n}.
\]