Group: _____ _____ _____ Name: _____

Math 231 A. Worksheet 13.

Determine if the following series converge absolutely, converge conditionally, or diverge. Give complete justification, and state which test or tests you are using.

1. $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^{n+1}\ln n}{\sqrt{n}}$.

2. $\displaystyle\sum_{n=1}^{\infty} \frac{1\cdot 3\cdot 5\cdots(2n-1)}{2\cdot 5\cdot 8\cdots(3n-1)}$.

3. $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{e^{n^2}}$.

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4. You are given that $\sum c_n(-3)^n$ converges, and that $\sum c_n 5^n$ diverges.

a) What are the possible values of the radius of convergence of the power series $\sum c_n x^n$?

What can you say about the convergence/divergence of the following series?

b) $\sum c_n(-6)^n$

c) $\sum c_n 2^n$

d) $\sum c_n 4^n$

e) $\sum c_n(-5)^n$

Use the ratio test to determine the radius of convergence. Then determine the interval of convergence.

5. $\displaystyle\sum_{n=1}^{\infty} \frac{n^2 x^{2n}}{(2n)!}$.

6. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{(x-3)^n}{n \cdot 5^n}$.

7. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{(x-3)^{2n}}{n \cdot 5^n}$.

8. $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{e^{n^2}}$ (the root test is also a good option for this one).