Math 232 Exam 2   April 27, 2015   Professor Ilya Kofman

NAME: _____

Justify answers and show all work for full credit!

For #1–8, determine convergence or divergence using any method we discussed. Justify!

1. $\displaystyle\sum_{n=1}^{\infty} \frac{n}{7n^4 + 3}$

2. $\displaystyle\sum_{n=1}^{\infty} \frac{10^n + 5}{n!}$

3. $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^3}$

4. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n e^n}{e^n + n}$

5. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{3/2} + n^{2/3}}$

6. $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^{3/2} + n^{2/3}}$

7. $\displaystyle\sum_{n=3}^{\infty} \frac{\ln(n)}{\sqrt{n}}$

8. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} - \frac{1}{\sqrt{n+1}}$

9. Find the sum for the series $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{5^{n+3}}}{e^{n+2}}$.

10. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(5 - 3x)^n}{2n + 7}$.

11. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(x - 4)^n}{n^2\, 5^n}$.

12. Find a power series that represents $f(x) = \dfrac{x^4}{1 + 2x^3}$.

    (a) Give first 4 terms of the series. **(b)** Give the series using Σ notation.

13. Evaluate the integral as an infinite series, $\displaystyle\int \sin\left(\frac{1}{x^2}\right)\, dx$.

    (a) Give first 4 terms of the series. **(b)** Give the series using Σ notation.

14. Find the Taylor series centered at $a = 3$ for $f(x) = \sqrt{x}$.

    (a) Give first 4 terms of the series. **(b)** Give the series using Σ notation.