Math 232 Exam 2 November 26, 2014 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. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n\, 3^{n+2}}{2^{n+1}}$

2. $\displaystyle\sum_{n=1}^{\infty} n^2\, e^{-n^3}$

3. $\displaystyle\sum_{n=1}^{\infty} \frac{n+5}{9^n}$

4. $\displaystyle\sum_{n=1}^{\infty} \frac{4^n\, n^2}{n!}$

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

6. $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^2+7}$

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

8. $\displaystyle\sum_{n=1}^{\infty} \frac{\pi^{7n}}{e^{8n}}$

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

10. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(2x-4)^n}{3n+5}$.

11. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(x+1)^n}{\sqrt{n}\, 3^n}$.

12. Find a power series that represents $f(x) = \ln(1+x^3)$.

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

13. Evaluate the integral as an infinite series, $\displaystyle\int \cos(x^2)\, dx$.

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

14. Find the Taylor series centered at $a = 2$ for $f(x) = \dfrac{1}{x^2}$.

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