Math 252 Calculus II (Bueler) Name: _____

Written Homework #13

Due at start of class Wednesday, 25 April 2018.

This Written Homework has problems from sections 11.7, 11.8, and 11.9. It is also a work sheet to do during the recitation section. Please work on it with other students! The submitted version must be written by you. You must show your work for full credit.

1. Test the series for convergence or divergence.

(a)

$$\sum_{n=1}^{\infty} \frac{n^{2n}}{(1+n)^{3n}}$$

(b)

$$\sum_{k=1}^{\infty} \frac{1}{2+\sin k}$$

(c)

$$\sum_{k=1}^{\infty} \frac{1}{k\sqrt{k^2+1}}$$

2. For each power series, find the radius and interval of convergence. Show adequate work.

(a)

$$\sum_{n=0}^{\infty} \frac{(x-2)^n}{n^2+1}$$

(b)

$$\sum_{n=1}^{\infty} 2^n n^2 x^n$$

(c)

$$\sum_{n=2}^{\infty} \frac{(x+2)^n}{5^n \ln n}$$

3. Find the radius and interval of convergence of the power series. Show adequate work.

$$\sum_{n=1}^{\infty} \frac{(5x-4)^n}{n^3}$$

4. (*Use a computer to help on this problem as much as you want.*) On the same axes, graph the partial sums s_1, s_2, s_3, s_6, s_9 of the series

$$\sum_{n=0}^{\infty} x^n$$

On the same axes plot the function $f(x) = 1/(1-x)$. On what interval do these partial sums appear to be converging to $f(x)$?

5. Find the radius and interval of convergence of the power series. Show adequate work.

$$\sum_{n=1}^{\infty} \frac{1}{n\, b^n}(x-a)^n, \qquad b>0$$

(Your answer will depend on a and b. It should be the correct answer for any a and any $b>0$.)

6. (a) Evaluate this indefinite integral as a power series:

$$\int \frac{x}{1+x^3}\, dx$$

(*Hints*. Follow Example 8 in section 11.9. Start from $1/(1+x^3) = 1/(1-(-x^3))$ as a geometric series. Then multiply by x and integrate term by term.)

(b) Use Wolfram alpha or an integral table to write down the indefinite integral in **(a)** without using power series.