**Section (circle one): 1 2 3 4 5 6**

Score:

**Team (circle one): a b c d e f**

**SM122 – Test #1–Fall 2010**

**Box/circle your final answer.**

**YOU MUST SHOW ALL WORK FOR FULL CREDIT.**

1. (10 pts) Find the formula for the general term $a\_{n}$ of the sequence (assume that the pattern of the first few terms continues and that n starts at 0). What is the sum of all of the elements of this sequence?

$$\left\{1,\frac{1}{3},\frac{1}{9},\frac{1}{27},\frac{1}{81},…\right\}$$

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| **No marks on this table** |
| **WA (10 pts)** |  |
| **1 (10pts)** | **333**  |
| **2 (10 pts)** |  **333**  |
| **3 (10 pts)** |  **333**  |
| **4 (10 pts)** |  |
| **5 (10 pts)** |  |
| **6 (10 pts)** |  |
| **7 (10 pts)** |  |
| **8 (20 pts)** |  |
| **cumm.** | **333**  | **333**  |

1. (10 pts) Consider the sequence $a\_{n}=\sqrt[n]{3^{2n+1}}$.
	1. Determine whether the sequence converges of diverges.
	2. If the sequence converges, find the limit.
	3. Would a series based on this sequence converge? Why?
2. (10 pts) Given the power that the power series of $\frac{1}{1-x}=\sum\_{n=0}^{\infty }x^{n}$ find the power series of $\frac{3}{2+x}$.
3. (10 pts) Test the series $\sum\_{n=1}^{\infty }\frac{4}{3}\left(-\frac{3}{4}\right)^{n}$ for convergence. If it converges, find the limit.
4. (10 pts) Find the radius and interval of convergence of the power series $\sum\_{n=0}^{\infty }\frac{8^{n}(x+2)^{n}}{(n+5)^{2}}$. Do not test the endpoints.

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1. (10 pts) Find the first three non-zero terms of the Maclaurin series for $f\left(x\right)=ln|1-x|$. Use this to estimate $ln⁡(1.1)$ to four decimal places. Recall for a Maclaurin series:

$$f\left(x\right)=\sum\_{n=0}^{\infty }\frac{f^{n}\left(a\right)}{n!}\left(x-a\right)^{n}$$

1. (10 pts) Given the Macluarin Series $\cos(\left(x\right))=\sum\_{n=0}^{\infty }\left(-1\right)^{n}\frac{x^{2n}}{\left(2n\right)!}$, find the Macluarin Series for $2x^{3}cos⁡(x^{2})$. Write out the first three terms of the series.
2. (20 pts) Find the first three terms of the Taylor polynomial for $f\left(x\right)=\sqrt[5]{x}$ centered on $=1$ . What is the maximum error (to 4 decimal places) if the interval of interest is $.6<x<1.4$. Recall for a Taylor series centered on $x=a$:

$$f\left(x\right)=\sum\_{n=0}^{\infty }\frac{f^{n}\left(a\right)}{n!}\left(x-a\right)^{n}$$