MA 126 - Fall 2016 - Prof. Clontz - Selected Questions

Name: $\qquad$

1. Prove that $\int_{1}^{3} \sqrt{4 t^{2}-12 t+10} d t$ is the arclength of the curve $y=x^{2}-3 x+4$ between $(1,2)$ and $(3,4)$.
2. Use the polar arclength formula to show that the circumference of the circle $r=4 \sin \theta$ is $4 \pi$.
3. Find $\lim _{n \rightarrow \infty} \frac{\sin n+3 n^{2}}{n^{2}+1}$.
4. Does $\sum_{n=3}^{\infty}\left(\frac{6}{n}-\frac{6}{n+1}\right)$ converge or diverge? If it converges, what is its value?
5. Does $\sum_{n=1}^{\infty} \frac{1}{4^{n}}$ converge or diverge? If it converges, what is its value?
6. Does $\sum_{j=2}^{\infty} \frac{e^{j}}{e^{2 j}+1}$ converge or diverge?
7. Find the domain of $f(x)=\sum_{m=2}^{\infty} \frac{(-2 x)^{m}}{m}=\frac{4 x^{2}}{2}-\frac{8 x^{3}}{3}+\frac{16 x^{4}}{4}-\frac{32 x^{5}}{5}+\ldots$.
8. Generate the Maclaurin Series for $\cosh x$.
9. Use Taylor's Formula to approximate $e^{-1 / 2}=\frac{1}{\sqrt{e}}$ with an error no greater than $\frac{1}{1000}=$ 0.001.

Reminder: These are examples of questions I may put on the final, so this is a good place to start studying, but this list is not exhaustive. You are responsible for understanding all material from Parts 4-6 of the course website, and for the types of problems which were asked on the Midterm.

