Exam 3   Calc 2   4/1/2016

Each problem is worth 10 points. For full credit provide complete justification for your answers.

1. Determine the value of $\displaystyle\sum_{n=1}^{\infty}\frac{1}{3^n}$.

2. Determine whether $\displaystyle\sum_{n=1}^{\infty}\frac{n}{n^3+3}$ converges or diverges.

3. Determine whether $\sum\limits_{n=1}^{\infty} \dfrac{(-1)^n}{\sqrt{n}}$ converges or diverges.

4. Set up an integral and evaluate it to find the arc length of $y = x^{3/2}$ on the interval $[1,2]$.

5. Determine whether the series $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^3}$ converges or diverges.

6. Find the Taylor series for $f(x) = \sin x$ centered at $x = \pi/2$.

7. Biff is a calculus student at Enormous State University, and he's having some trouble. Biff says "Well, crap. This series stuff is hard. I don't even know what half of it means. What the heck is the difference between absolute convergence and conditional convergence anyway? I mean, either it converges or not, right?"

Help Biff by explaining clearly the difference between conditional and absolute convergence.

8. Use a Taylor series with at least 3 nonzero terms to approximate ln 0.9.

9.

10. Determine the interval of convergence of the series $\displaystyle\sum_{n=1}^{\infty} n(x-4)^n$.

Extra Credit (5 points possible):

Find the sum of the series $\pi - \dfrac{\pi^3}{3!} + \dfrac{\pi^5}{5!} - \dfrac{\pi^7}{7!} + \ldots$.