Math 107H Fall '10 **Exam 2** **Score:** _____

Name: _____ **TA's Name:** _____

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(15 pts) Find the sum of the following:

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

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

2(10 pts) Find the Taylor polynomial $P_2(x)$ and the remainder $R_2(x)$ for the function $f(x) = \sqrt{1+x}$ at $x = 3$.

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3(10 pts) For approximately what values of x can you replace $\sin x$ by $x - x^3/6$ with an error of magnitude no greater that 10^{-4}? Give reasons for your answer.

4(10 pts) Estimate the number of terms needed in order for the nth partial sum S_n to approximate this series $\sum_{n=1}^{\infty}(-1)^n \frac{1}{n2^{n+1}}$ to the 8th decimal place accuracy.

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5(30 pts) Determine if the following series converge absolutely, or conditionally, or diverge.

(a) $\displaystyle\sum_{n=1}^{\infty}(-1)^n\frac{n+2}{2n+\sqrt{n}-1}$

(b) $\displaystyle\sum_{n=2}^{\infty}(-1)^n\frac{1}{n\ln n}$

(c) $\displaystyle\sum_{n=0}^{\infty}\frac{2^n(n!)^2}{(2n)!}$

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6(25 pts) Determine the following for the power series $\sum_{n=0}^{\infty} n\frac{(3x+2)^n}{2^{n+1}}$: a) The center and radius of convergence, b) interval of absolute convergence, c) interval of convergence, and d) intervals of divergence.

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2 Bonus Points: True or False: Georgia is a country in Asia. _____ (*... The End*)