NAME: **MAC2312/Quiz-10**

READ ME FIRST: Show me all the magic very neatly on the page, for I do not read minds. Use correct notation when presenting your computations and arguments. Use complete sentences. Remember this: "=" denotes "equals" , "⇨" denotes "implies" , and "⇔" denotes "is equivalent to". Since the answer consists of all the magic transformations, do not "box" your final results. Eschew obfuscation.

1. (4 pts.) Classify the given series as absolutely convergent, conditionally convergent, or divergent. Warning: For full credit, proof is required.

$$\sum_{k=1}^{\infty} \frac{(-1)^k}{\sqrt{k}}$$

2. (4 pts.) The series below satisfies the hypotheses of the alternating series test. Find a value of n for which the nth partial sum is ensured to approximate the sum of the series to two decimal places. Warning: For full credit, proof is required.

$$\sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{\sqrt{k}}$$

3. (8 pts.) [Complete the following.] (a) If $f(2) = 3$, $f'(2) = -4$, and $f''(2) = 10$, then the second Taylor polynomial for f about x = 2 is

$$p_2(x) =$$

(b) If f has derivatives of all orders at x_0, then the Taylor series for f at $x = x_0$ is defined to be

$$\sum_{k=0}^{\infty}$$

(c) If a function f has an nth Taylor polynomial $p_n(x)$ about $x = x_0$, then the nth remainder $R_n(x)$ is defined by

$$R_n(x) =$$

(d) Suppose the function f can be differentiated five times on the interval I containing $x_0 = 2$ and that $|f^{(5)}(x)| \le 20$ for all x in I. Then, for all x in I,

$$|R_4(x)| \le$$

4. (4 pts.) Consider $\sum_{k=1}^{\infty} \frac{(-1)^k}{k\,10^k}(x-1)^k$. From ratio test for absolute convergence,

since $\lim_{k\to\infty} \left|\frac{u_{k+1}}{u_k}\right| = \frac{1}{10}|x-1|$. , the radius of convergence is R =

Substitution of $x = -9$ yields $\sum_{k=1}^{\infty} \frac{(-1)^{2k}}{k} = \sum_{k=1}^{\infty} \frac{1}{k}$, and substitution of $x = 11$ yields $\sum_{k=1}^{\infty} \frac{(-1)^k}{k}$ Consequently, the interval of convergence is $I =$