Exam 3 Review-2

Name:_____

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Directions: Work in groups to complete the following problems.

1. Write the first 4 nonzero terms of the Taylor series expansion about 0 for the function. Give R, the radius of convergence for the series.

   (a) $x^2(1+x)^{\frac{1}{3}}$

   (b) $\int xe^x dx$

   (c) e^{3x}

   (d) $\frac{d}{dx}((1+x)^\pi)$

2. In each case give a simple answer for the sum of the series.

   (a) $\sum_{n=2}^{\infty} \left(-\frac{3}{4}\right)^n$

   (b) $\sum_{n=0}^{\infty} (-1)^n \frac{(3\pi)^{2n}}{2^{2n}(2n)!}$

   (c) $\sum_{n=0}^{\infty} \frac{(-1)^n e^n}{n!}$

3. Find the domain for the $\sum_{n=1}^{\infty} \frac{x^n}{n4^n}$.

4. Approximate $f(x) = \sqrt{x}$ with the degree 3 Taylor polynomial centered at 4. Use Taylor's inequality to estimate the accuracy of the approximation $f(x) \approx T_3(x)$ when $4 \le x \le 4.2$

5. In each case state whether the series converges or diverges. Give a reason/ argument.

   (a) $\sum_{n=1}^{\infty} \frac{\sqrt{k}+100}{k^2-18}$

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

   (c) $\sum_{k=1}^{\infty} \frac{1}{k(\ln(k))^2}$

6. Write down the finite Taylor series expansion about $x = -1$ for the function $f(x) = x^5$. What is the degree 3 Taylor polynomial?

7. Find the radius of convergence for $\sum_{n=1}^{\infty} \frac{(n!)x^{2n+1}}{(2n)!}$