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MATH 152 Dr. Z. , **Post-Exam Practice for Exam II; Practice 2**,
(For people who scored less than 70 in Exam II and still wish to be eligible for the "deal")

1. (10 points) Use the **integral test** to determine whether the series is convergent or divergent. Explain everything!

$$\sum_{n=1}^{\infty} \frac{n^2}{e^{3n}}$$

(You must use the integral test. No credit for other methods!)

2. (10 points, 5 each) Determine whether the following series converge or diverge. Explain what test(s) you are using.

$$(a) \quad \sum_{n=1}^{\infty} \frac{7n^3 + 18n + 4\sqrt{n}}{n^6 + 4n^5 + 9} \quad ,$$

$$(b) \quad \sum_{n=1}^{\infty} \frac{7 + 14\sqrt{n}}{n^3} \quad .$$

3. (10 points: 3,3,4 resp.) Determine whether the following series converge or diverge

$$(a)\sum_{n=1}^{\infty}\frac{\cos^4 n}{n(\ln n)^2} \quad , \quad (b)\sum_{n=1}^{\infty}\frac{1}{3n-10\sqrt{n}+1} \quad , \quad (c)\sum_{n=1}^{\infty}\frac{1}{10-4^{-n}} \quad .$$

4. (10 points) Use the sum of the first 3 terms to approximate the sum of the series. Estimate the error.

$$\sum_{n=1}^{\infty} \frac{n+2}{(n+3)3^n} \quad .$$

5. (10 points, 5 each) Determine whether the following series are absolutely convergent, conditionally convergent or divergent.

$$(a) \quad \sum_{n=1}^{\infty} \frac{n^2}{3^n} \quad ,$$

$$(b) \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n \ln(n+1)} \quad ,$$

6. (10 points, 5 each) Determine whether the following series are absolutely convergent, conditionally convergent or divergent.

$$(a) \sum_{n=1}^{\infty} \frac{(-1)^n n!}{n^n} \quad .$$

$$(b) \sum_{n=1}^{\infty} \frac{n^n}{2^n n!} \quad .$$

7. (10 points) Find the radius of convergence and interval of convergence of the series

$$\sum_{n=1}^{\infty} \frac{(x-1)^n}{n^2 5^n} \quad .$$

8. (10 points) Find a power series representation for the function and determine the interval of convergence.

$$f(x) = \frac{x^8}{27 + x^3} \quad .$$

9. (10 points) Find the Maclaurin series for $f(x) = 2e^{x+5}$ using the **definition** of a Maclaurin series.

10. (10 points, 5 each) (a) Expand $\sqrt[5]{1+x}$ as a power series. (b) Use part (a) to estimate $\sqrt[5]{1.1}$ correct to six decimal