THIS IS AN EXAM FROM ABOUT 12 YEARS AGO. THE EXAM FOR OUR CLASSWILL BE OF A SIMILAR NATURE.

I. DETERMINE THE CONVERGENCE OR DIVERGENCE OF EACH SERIES. ALSO:

(A) STATE THE NAME OF THE TEST YOU USE

(B) IF A SERIES IS EITHER GEOMETRIC OR TELESCOPING, AND IT CONVERGES, FIND THE SUM OF THE SERIES.

1. $\sum_{n=0}^{\infty} 16(-.3)^n$

2. $\sum_{n=1}^{\infty} \frac{n+4}{n^6+n^4-1}$

3. $\sum_{n=1}^{\infty} \left(\frac{2}{2n-3} - \frac{2}{2n-1} \right)$

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

5. $\sum_{n=1}^{\infty} \frac{(-1)^n (n+5)!}{[2 \bullet 7 \cdot 12 \cdot \ldots \cdot (5n-3)]}$

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

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

8. $\sum_{n=1}^{\infty} \frac{n+5}{n^2 \sqrt{n+3}}$

9. $\sum_{n=0}^{\infty} \left(\frac{1}{\sum_{n=0}^{\infty} \left(\frac{2}{5} \right)^n} \right)^n$

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

II. FOR EACH POWER SERIES, DETERMINE THE CENTER, INTERVAL, AND RADIUS OF CONVERGENCE.

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

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

13. $\sum_{n=1}^{\infty} \frac{(2n)!\, x^{2n+1}}{(n!)^2 (2n+1)}$

III. GIVEN THE POWER SERIES FOR $f(x) = e^x$ IS $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ USE THE FIRST FOUR TERMS OF THE SERIES TO ESTIMATE THE VALUE OF THE INTEGRAL.

14. $\int_0^1 e^{x^2}\, dx$