AP Calculus BC Name ______________________________________

Determine the convergence or divergence of the following series and state the test used. If the series is geometric or telescoping, find the sum of the series.

1. $e-\frac{e^2}{5}+\frac{e^3}{25}-\frac{e^4}{125}+\cdots$

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

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

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

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

6. $\sum_{n=2}^{\infty} \frac{4^n}{3^n-3}$

7. $\sum_{n=0}^{\infty} \frac{2^{n+1}+3}{4^n}$

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

9. $\sum_{n=1}^{\infty} \frac{\sqrt{n}+\sqrt[3]{n}}{n^2+n^3}$

10. $\sum_{n=1}^{\infty} \ln(1+1/n)$

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

12. $\sum_{n=1}^{\infty} \left(1+\frac{1}{n}\right)^n$

13. $\sum_{n=1}^{\infty} \frac{2}{n^2+4n+3}$.

14. $1+\frac{1}{5}+\frac{1}{9}+\frac{1}{13}+\cdots+\frac{1}{4n-3}+\cdots$

15. $\sum_{n=1}^{\infty} \frac{2^{n+1} + 9^{n/2}}{5^n}$.

16. $\sum_{n=2}^{\infty} \frac{\ln n}{n+1}$

17. $\sum_{n=2}^{\infty} \frac{n}{\ln(n)^3}$

18. $\frac{5}{1 \times 3} + \frac{5}{2 \times 4} + \frac{5}{3 \times 5} + \ldots$

19. $\sum_{n=1}^{\infty} (-1)^n \frac{e^{1/n}}{n}$

20. $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$

21. $\sum_{n=1}^{\infty} \frac{8 \tan^{-1} n}{n^2+1}$

22. $\sum_{n=3}^{\infty} \frac{1}{\sqrt{n-2}}$

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

24. $\sum_{n=3}^{\infty} \frac{3}{\sqrt{n^2-4}}$

First determine if the given series satisfies the conditions of the Alternating Series Test. Then, if the series does satisfy the conditions, decide how many terms need to be added in order to approximate the sum to within 1/1000.

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

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

27. $\sum_{n=1}^{\infty} (-1)^{n-1} n e^{-n}$

28. $\sum_{n=1}^{\infty} (-1)^n \frac{n}{8^n}$