AP Calculus BC

Name: ________________________________

10.6 Worksheet

Period: ____________

Verify the formula

1. $\frac{n*5^{n+2}}{5^{n+1}} = 5n$

2. $\frac{(n+1)*4^{n}}{n*4^{n+1}} = \frac{n+1}{4n}$

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

4. $\frac{(2k-2)!}{(2k)!} = \frac{1}{(2k)(2k-1)}$

Use the Ratio Test to determine the convergence or divergence of the series.

5. $\sum_{n=1}^{\infty} \frac{1}{5^n}$

6. $\sum_{n=1}^{\infty} \frac{1}{n!}$

7. $\sum_{n=0}^{\infty} \frac{n!}{3^n}$

8. $\sum_{n=1}^{\infty} \frac{6^n}{n!}$

9. $\sum_{n=1}^{\infty} \frac{9^n}{n^5}$

10. $\sum_{n=1}^{\infty} \frac{n}{4^n}$

11. $\sum_{n=0}^{\infty} \frac{6^n}{(n+1)^n}$

12. $\sum_{n=0}^{\infty} \frac{5^n}{2^n+1}$

13. $\sum_{n=1}^{\infty} \frac{(2n)!}{n^5}$

14. $\sum_{n=0}^{\infty} \frac{(n!)^2}{(3n)!}$

15. $\sum_{n=0}^{\infty} \frac{(-1)^n 2^{4n}}{(2n+1)!}$

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

Use the Root Test to determine the convergence or divergence of the series.

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

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

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

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

21. $\sum_{n=1}^{\infty}\left(2\sqrt[n]{n}+1\right)^{n}$

22. $\sum_{n=0}^{\infty} e^{-3n}$

23. $\sum_{n=1}^{\infty} \frac{n}{3^n}$

24. $\sum_{n=1}^{\infty} \left(\frac{n}{500}\right)^{n}$

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

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

Use either the Root Test or Ratio Test to determine the convergence or divergence of the series.

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

28. $\sum_{n=1}^{\infty} \frac{100}{n}$

29. $\sum_{n=1}^{\infty} \frac{3}{n\sqrt{n}}$

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

31. $\sum_{n=1}^{\infty} \frac{5n}{2n-1}$

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

Calculus 2 - Unit 10 Part 1 REVIEW
Determine whether the series diverges or converges.
<u>You must show a valid test and work to justify your answer</u>.

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

#2) $\sum_{n=1}^{\infty}\frac{8^n}{5^n}$

#3) $\sum_{n=1}^{\infty}\frac{3^n}{4^n-1}$

#4) $\sum_{n=1}^{\infty}\frac{n}{\ln(n)}$

#5) $\sum_{n=1}^{\infty}\frac{n!}{3^n}$

#6) $\sum_{n=1}^{\infty}\frac{1}{5^n+1}$

#7) $\sum_{n=1}^{\infty}\frac{4n}{2n^2+1}$

#8) $\sum_{n=1}^{\infty}\frac{2}{n^2}$

#9) $\sum_{n=1}^{\infty}\frac{2n^3}{n^3+4}$

#10) $\sum_{n=1}^{\infty}(-1)^n\frac{5n-1}{4n+1}$

#11) $\sum_{n=0}^{\infty}5\frac{2^n}{3^n}$

#12) $\sum_{n=1}^{\infty}\sin\left(\frac{(2n-1)\pi}{2}\right)$

#13) $\sum_{n=1}^{\infty}\frac{1}{5^n}$

#14) $\sum_{n=1}^{\infty}\frac{1}{2n-1}$

#15) $\sum_{n=1}^{\infty}\frac{\ln(n)}{n^2}$

#16) $\sum_{n=1}^{\infty}\frac{n}{n^2+1}$

#17) $\sum_{n=1}^{\infty}(-2)^n$

#18) $\sum_{n=1}^{\infty}\frac{5n^4}{n^4+n^2+7}$

#19) $\sum_{n=1}^{\infty}\frac{9^n}{n^5}$

#20) $\sum_{n=1}^{\infty}\frac{5}{n^{0.4}}$

#21) $\sum_{n=1}^{\infty}\left(\frac{n}{2n+1}\right)^n$

#22) $\sum_{n=1}^{\infty}(-1)^n\frac{1}{3^n}$

Determine whether the series converges absolutely, conditionally, or diverges:

#23) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n!}$

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

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

#26) Determine the minimum number of terms required to approximate the sum of the series $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{2n^3 - 1}$ with an error of less than 0.0005.