AP Calculus BC – Power series Practice

For the following, determine the a) center b) radius of convergence and c) interval of convergence:

1. $\displaystyle\sum_{n=0}^{\infty}\frac{nx^n}{4^n(n^2+1)}$

2. $\displaystyle\sum_{n=0}^{\infty}\frac{10^n(x+2)^n}{n!}$

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

4. Determine the power series representations for $f'(x)$ and $\displaystyle\int_{-2}^{x}f(t)dt$ for the f(x) given in #2. General term only.

Give the series representation and the interval of convergence for the following: (Include at least 3 terms and general term)

5. $f(x)=\dfrac{2}{2-3x}$ centered at -2

6. $f(x)=\dfrac{1}{x}$ centered at 1

7. $f(x)=\ln x$ centered at 1.

8. $f(x)=\ln(1+x)$ centered at 0

9. Using your result from 8, determine the series representation for $\dfrac{4\ln(1+x)}{x}-4$.

10. Using your power series from #8, approximate $\displaystyle\int_{0}^{0.2}\ln(1+x)dx$ so that the error $R_N\le.001$. Show all work.