1. Find the power series representation of $\frac{1}{1+x}$

2. Use (1) above to find the Maclaurin series representation of $\frac{t}{1+t^2}$

3. Find the Maclaurin series representation of $\ln(1+x^2)$. 
   
   Note: you may use $\int_0^x \frac{t}{1+t^2} \, dt$.

4. What is the radius of convergence of the power series in (4)
5. Use (4) to find the sum of the alternating harmonic series \( \sum_{n=1}^{\infty} \frac{(-1)^n}{n} \)

6. Find the Taylor series of \( \frac{1}{1+x} \) centered at \( c = 2 \) (i.e. in powers of \( x-2 \))