HW 8 PROBLEMS

From Rudin 4,6,7,8,10 from Chapter 8. Also solve the following problem:

Problem 1. What is the power series of $\ln(1+x)$ at $x_0 = 0$? What is its radius of convergence? Prove that $\ln(1+x)$ equals its power series on $[0,1]$ - here you may need to use Problem 3 from HW 7. Conclude with the equality

$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + ... = \log 2.$$

Note: you can also show that $\ln(1+x)$ equals its power series on $(-1,0]$. but you will need a more delicate reminder theorem - a good reference there is Advanced Calculus by Fitzpatrick.