Math 419 HW #4
Due 3:00 PM Friday, Sept. 27

1. Let m be a positive integer. Find the Taylor series centered at $z = 0$ for the function

$$f(z) = \frac{1}{(1-z)^m}.$$

2. Find the Taylor series centered at $z = 0$ for the function

$$f(z) = \frac{z}{(1+z^2)}.$$

3. Determine the radius of convergence of the power series $\sum_{n=1}^{\infty} a_n z^n$ when:

   (a) $a_n = (\log n)^2$

   (b) $a_n = n!$ (Note: the answer is in the book, but you need to justify your answer.)

   (c) $a_n = \frac{n^2}{4^n + 3n}$