1. (60 pts.) Determine if each of the following series is convergent or divergent. You must give correct reasons for your answers to receive credit.

   (a) \( \sum_{n=2}^{\infty} \frac{1}{\sqrt{n} + 3} \)  
   (b) \( \sum_{n=2}^{\infty} \frac{(-1)^n}{\sqrt{n} + 3} \)  
   (c) \( \sum_{n=1}^{\infty} \frac{n + 2^n}{n^2} \)  
   (d) \( \sum_{n=0}^{\infty} \tan n \)  
   (e) \( \sum_{n=0}^{\infty} \frac{6^{2n-3}}{3^{3n+3}} \)  
   (f) \( \sum_{n=0}^{\infty} \frac{3^{3n+3}}{6^{2n-3}} \)

2. (20 pts) Find the radius of convergence AND the interval of convergence of the power series \( \sum_{n=0}^{\infty} \frac{n^2(x + 3)^n}{2^n} \).

3. (20 pts.) Find the coefficients of \( x^{10} \) and \( x^{11} \) in the Taylor series for \( (1 + x)e^{-2x^2} \) at \( a = 0 \). You may leave powers and factorials in your answer; for example, \( 8!/311 \) is a perfectly good form for an answer—but it is not the answer. 

   Hint: If you know the Taylor series for \( e^x \), you can do this problem without computing derivatives of \( (1 + x)e^{-2x^2} \).