**Worksheet #39:** Radius of Convergence of a Power Series

**Basic Guidelines:**
Steps to determine the Radius of Convergence, R, and the Interval of Convergence, I:

(1) Apply the Ratio Test for Absolute Convergence and set $\rho = \lim_{k->+\infty} \frac{|u_{k+1}|}{|u_k|} < 1$.

(2) Solve the inequality to find $I^o = (-R, R)$ (the open interval of convergence).
(3) Determine the convergence at each endpoint to see if they are included in I.

(1) Determine the radius and interval of convergence for the following power series. Is it a known series?

(a) $\sum_{k=0}^{+\infty} \frac{3^k}{(k+2)^2} x^k$

(b) $\sum_{k=0}^{+\infty} (-1)^k \frac{x^{2k}}{(2k)!}$

(2) Write the Maclaurin series for the function using the sigma notation.

(a) $e^x =$ (b) $\frac{1}{1+x} =$ (c) $\cosh(x) =$