Warm-Up Problems and Lecture Problems
Solutions
April 16, 2003

1. For each of the power series below, determine the radius of convergence and the interval of convergence.

Series	Radius of Convergence	Interval of Convergence
$\sum_{n=0}^{\infty} x^n$	$R = 1$	$I = (-1, 1)$
$\sum_{n=0}^{\infty} nx^{n-1}$	$R = 1$	$I = (-1, 1)$
$\sum_{n=0}^{\infty} \frac{x^{n+1}}{n+1}$	$R = 1$	$I = [-1, 1)$
$\sum_{n=0}^{\infty} \frac{x^{n+2}}{(n+1)(n+2)}$	$R = 1$	$I = [-1, 1]$

2. Try and determine the relationship between the power series in question 1.
(Hint: write out the terms of the series.)

3. Solve the initial value problem: $\frac{dy}{dx} = y$, $y(0) = 1$.
Solution: This is a separation of variables. First you solve and get $\ln|y| = x + C$ or $y = Ae^x$. Using the initial condition gives $y = e^x$.