

Answers to Exam 4

1. $f(x) = \ln(1 + 2x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{2^n x^n}{n}$, $R = 1/2$
2. (a) converges to $\ln(1/3)$
(b) converges to $1/2$
3. $R = 1/2$, $I = [-1/2, 1/2]$
4. (a) converges (use the Integral Test)
(b) converges (use L.C.T.)
5. (a) converges absolutely; use the Ratio Test
(b) conditionally convergent
6. converges to $\frac{x-2}{5-x}$ for $-1 < x < 5$
7. (a) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$
(b) $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{1}{n}$ and $\sum_{n=1}^{\infty} b_n = -\sum_{n=1}^{\infty} \frac{1}{n}$
8. (a) $\sum_{n=1}^{\infty} \frac{1+3^n}{4^n} = \frac{10}{3}$, converges
(b) diverges since $\lim_{n \rightarrow \infty} \frac{n^2+1}{2n^2+n} = \frac{1}{2}$