

Supplementary Exercises on Infinite Series II

1. Determine which of the following series are absolutely convergent, which are conditionally convergent, and which are non – convergent:

(a) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{2m-1}$	(b) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{(2m-1)^3}$	(c) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{\ln(m+1)}$
(d) $\sum_{m=1}^{\infty} \frac{\sin\left((2m-1)\frac{\pi}{2}\right)}{m^2}$	(e) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{m \cdot 2^m}$	(f) $\sum_{m=1}^{\infty} (-1)^{m+1} \frac{m+1}{m}$
(g) $\sum_{m=1}^{\infty} \frac{(-1)^m}{\sqrt{m}}$	*(h) $\sum_{m=1}^{\infty} (-1)^{m+1} \frac{m^3}{2^m}$	*(i) $\sum_{m=1}^{\infty} \frac{(-1)^m}{m - \ln(m)}$
(j) $\sum_{m=1}^{\infty} (-1)^{m+1} \frac{2m^2}{m!}$		

2. Find the sets of values of x for which the given power series converge:

(a) $\sum_{m=1}^{\infty} x^m$	(b) $\sum_{m=1}^{\infty} (\ln(x))^m$	(c) $\sum_{m=1}^{\infty} x^{m^2}$
(d) $\sum_{m=1}^{\infty} \frac{x^m}{m^2}$	(e) $\sum_{m=1}^{\infty} \frac{x^m}{\sqrt{m}}$	*(f) $\sum_{m=1}^{\infty} \frac{1}{1+x^m}$
(g) $\sum_{m=1}^{\infty} m(m+1)x^m$	*(h) $\sum_{m=1}^{\infty} \frac{x^m}{m+\sqrt{m}}$	*(i) $\sum_{m=1}^{\infty} \frac{x^m}{1+x^{2m}}$
(j) $\sum_{m=1}^{\infty} \sin\left(\frac{x}{2^m}\right)$	*(k) $\sum_{m=1}^{\infty} x^m \tan\left(\frac{x}{2^m}\right)$	

3. Find the intervals of convergence of the following power series:

(a) $\sum_{m=1}^{\infty} 10^m x^m$	(b) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{m} x^m$	(c) $\sum_{m=0}^{\infty} m! x^m$
(d) $\sum_{m=0}^{\infty} 2^m x^{2m}$	(e) $\sum_{m=1}^{\infty} \frac{(-1)^{m+1}}{(2m-1)(2m-1)!} x^{2m-1}$	
(f) $\sum_{m=1}^{\infty} m^m x^m$	*(g) $\sum_{m=1}^{\infty} \frac{\ln(m+1)}{m+1} x^{m+1}$	

