

Problem Set 30

1) What is a power series? Give some representative examples of a power series.

2) What is a Radius of Convergence? an Interval of Convergence? How do you find them?

3) Find (a) the radius and interval of convergence for each power series. For what values of  $x$  does the series converge (b) absolutely, (b) conditionally?

i) (10.7.4)

$$\sum_{n=1}^{\infty} \frac{(3x-2)^n}{n}$$

iii) (10.7.22)

$$\sum_{n=1}^{\infty} \frac{(-1)^n 3^{2n} (x-2)^n}{2n}$$

ii) (10.7.14)

$$\sum_{n=1}^{\infty} \frac{(x-1)^n}{n^3 3^n}$$

iv) (10.7.24)

$$\sum_{n=1}^{\infty} (\ln n) x^n$$

4) Find the interval of convergence for each series and find the sum of the series as a function of  $x$ .

a) (10.7.42)

$$\sum_{n=0}^{\infty} (e^x - 4)^n$$

b) (10.7.48)

$$\sum_{n=0}^{\infty} \left( \frac{x^2 - 1}{2} \right)^n$$