Contents

1 Section 11.1

1.1 11.1.4

Find a power series solution of the differential equation below. Determine the radius of convergence of the resulting series, and use the series given below to identify the series in terms of familiar elementary functions.

$$y' - 4xy = 0$$

$$y = \sum_{n=0}^{\infty} a_n x^n$$
$$y' = \sum_{n=1}^{\infty} n a_n x^{n-1}$$

$$\sum_{n=1}^{\infty} n a_n x^{n-1} - 4x \left(\sum_{n=0}^{\infty} a_n x^n \right) = 0$$
$$\sum_{n=1}^{\infty} n a_n x^{n-1} + \sum_{n=0}^{\infty} -4 a_n x^{n+1} = 0$$
$$\sum_{n=0}^{\infty} (n+1) a_{n+1} x^n + \sum_{n=1}^{\infty} -4 a_{n-1} x^n = 0$$
$$a_n + \sum_{n=1}^{\infty} \left[(n+1) a_{n+1} - 4 a_{n-1} \right] x^n = 0$$
$$a_n = 0$$
$$a_{n+1} = \frac{4 a_{n-1}}{n+1}$$