

1. Ex. 1, 3, 6, 7, 8, Sec.8.3, *Cooper*.

2. Let

$$f(x) = \frac{1}{1+x^2}.$$

The function  $f$  is analytic on  $(-\infty, \infty)$ . However if we expand  $f$  in a power series about any point  $x_0$ , the radius of convergence  $R(x_0)$  is finite. Find the formula for  $R(x_0)$ .

3. Obtain a series expansion for the integral

$$\int_0^{1/2} \frac{1}{1+x^4} dx$$

and justify your calculation.