

1. Find the power expansion of functions and give their radius of convergence.

(a)

$$f(x) = \frac{x^3}{(x-2)^2}$$

(b)

$$g(x) = x^2 e^{-x}$$

2. Solve the ordinary differential equations.

(a)

$$\frac{dy}{dx} = \frac{y \cos x}{1 + y^2}, \quad y(0) = 1$$

(b)

$$y'' + y' - 6y = 3$$