

MTH 244

Quiz IV (Take home quiz)

Name:

Show all your work.!

(1) Find the general solution of the given ODE

$$y'' - 2y' + y = te^t + 4 \quad y(0) = 1, \quad y'(0) = 1$$

- (2) Verify that the given functions satisfy the corresponding homogeneous equation. Then find a particular solution of the given nonhomogeneous equation
- $$x^2 y'' - 3xy' + 4y = x^2 \ln x, \quad x > 0, \quad y_1(x) = x^2, \quad y_2(x) = x^2 \ln x$$

(3) Determine the radius of convergence of the given power series

(a)
$$\sum_{n=0}^{\infty} \frac{(-1)^n n^2 (x+2)^n}{3^n}$$

(b)
$$\sum_{n=0}^{\infty} \frac{n}{2^n} x^n$$

- (4) Determine the Taylor series about the point x_0 for the given function, also determine the radius of convergence of the series.

$$\frac{1}{1+x}, \quad x_0 = 3$$

- (5) Solve the given equations by means of a power series about the point x_0 . Find the recurrence relation; also find the first four terms in each of the linearly independent solutions.

$$(1 + x^2)y'' - 4xy' + 6y = 0, \quad x_0 = 0$$