MATH 2552 Differential Equations: Series solutions of differential equations

1. What is the general form of a series solution to a differential equation?

A. y = a_0 + a_1x + a_2x^2 + ...

B. y = a_0e^x + a_1e^2x + a_2e^3x + ...

C. y = a_0 + a_1e^x + a_2e^2x + ...

D. y = a_0e^x + a_1x + a_2x^2 + ...

2. Which of the following differential equations has a series solution?

A. y'' + y = 0

B. y' + y = 0

C. y'' - y = 0

D. y' - y = 0

3. Which of the following is NOT a requirement for a differential equation to have a series solution?

A. The equation must be linear.

B. The equation must be homogeneous.

C. The equation must have constant coefficients.

D. The equation must be of order two or less.

4. What is the radius of convergence of the series solution to the differential equation y'' + 4y' + 13y = 0?

A. R = 1

B. R = 3

C. R = -1

D. R = -3

5. What is the interval of convergence of the series solution to the differential equation y'' + 4y' + 13y = 0?

A. I = (-3, -1)

B. I = (-1, 1)

C. I = (1, 3)

D. I = (3, 5)

6. Which of the following differential equations does NOT have a series solution?

A. y'' + y = 0

B. y' + y = 0

C. y'' - y = 0

D. y' - y = 0

7. Which of the following is NOT a requirement for a differential equation to have a series solution?

A. The equation must be linear.

B. The equation must be homogeneous.

C. The equation must have constant coefficients.

D. The equation must be of order two or less.

8. What is the radius of convergence of the series solution to the differential equation y'' + 4y' + 13y = 0?

A. R = 1

B. R = 3

C. R = -1

D. R = -3

9. What is the interval of convergence of the series solution to the differential equation y'' + 4y' + 13y = 0?

A. I = (-3, -1)

B. I = (-1, 1)

C. I = (1, 3)

D. I = (3, 5)

10. Which of the following differential equations does NOT have a series solution?

A. y'' + y = 0

B. y' + y = 0

C. y'' - y = 0

D. y' - y = 0

Answer Key:

1. C

2. B

3. D

4. B

5. C

6. D

7. D

8. B

9. C

10. D