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NPTEL

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Courses » Mathematical Methods and its Applications

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Unit 3 - Week 2

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Course outline

How to access the portal?

Week 1

Week 2

- Methods for finding particular integrals for second order linear differential equations with constant coefficients I
- Methods for finding particular integrals for second order linear differential equations with constant coefficients II
- Methods for finding particular integrals for second order linear differential equations with constant coefficients III
- Cauchy-Euler equation
- Methods of reduction for second order-linear differential equations
- Quiz : Assignment 2
- Solution for Assignment-2

Week 3

Week 4

Week 5

Week 6

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Week 10

Week 11

Week 12

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Interaction Session

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-02-13, 23:59 IST.

1) *The particular integral of the differential equation* $y'' + y' + y = (1 - e^x)^2$, *is* *1 point*

- $1 - \frac{1}{3}e^x + \frac{1}{7}e^{2x}$
- $1 - \frac{2}{3}e^x + \frac{1}{5}e^{2x}$
- $1 - \frac{2}{3}e^x + \frac{1}{7}e^{2x}$
- $1 - \frac{1}{3}e^x + \frac{1}{5}e^{2x}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$1 - \frac{2}{3}e^x + \frac{1}{7}e^{2x}$

2) *The particular integral of the differential equation* $y'' - 4y' + 4y = 8(e^{2x} + \sin 2x + x^2)$, *is* *1 point*

- $4x^2e^{2x} + \cos 2x + 2x^2 + 8x + 15$
- $x^2e^{2x} + \cos 2x + x^2 + 4x + 3$
- $\frac{x^2e^{2x}}{2} + \frac{1}{8}\cos 2x + \frac{1}{4}x^2 + \frac{1}{2}x + \frac{3}{8}$
- $4x^2e^{2x} + \cos 2x + 2x^2 + 4x + 3$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$4x^2e^{2x} + \cos 2x + 2x^2 + 4x + 3$

3) *The particular integral of the differential equation* $y'' - 3y' + 2y = \sin(e^{-x})$, *is* *1 point*

- $e^{2x}\cos(e^{-x})$
- $e^{2x}\sin(e^{-x})$
- $-e^{2x}\cos(e^{-x})$
- $-e^{2x}\sin(e^{-x})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$-e^{2x}\sin(e^{-x})$

4) *The particular integral of the differential equation* $y'' + a^2y = \tan ax$, *is* *1 point*

- $\frac{\ln(\sec ax + \tan ax)\sin ax}{a^2}$
- $\frac{-\ln(\sec ax + \tan ax)\cos ax}{a^2}$
- $\frac{-\ln(\sec ax + \tan ax)\sin ax}{a^2}$

$$\frac{\ln(\sec ax + \tan ax)\cos ax}{a^2}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$$\frac{-\ln(\sec ax + \tan ax)\cos ax}{a^2}$$

5) *The particular integral of the differential equation* $y'' - 2y' + y = x^2 e^x \cos x$, *is* **1 point**

- $e^x(-x^2\cos x + 4x\sin x + 6\cos x)$
- $e^x(x^2\cos x + 4x\sin x - 6\cos x)$
- $e^x(x^2\cos x - 4x\sin x + 6\cos x)$
- $e^x(-x^2\cos x + 4x\sin x - 6\cos x)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$e^x(-x^2\cos x + 4x\sin x + 6\cos x)$

6) *The general solution of the differential equation* $x^2y'' + 3xy' + y = \frac{1}{(1-x)^2}$, *is* **1 point**

- $y = (c_1 + c_2 x)e^{-x} + x^{-1}\ln\frac{x}{x-1}$
- $y = (c_1 + c_2\ln x)x^{-1} + \ln\frac{x}{x-1}$
- $y = \left(c_1 + c_2\ln x + \ln\frac{x}{x-1}\right)x^{-1}$
- $y = (c_1 + c_2 x)e^{-x} + \ln\frac{x}{x-1}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = \left(c_1 + c_2\ln x + \ln\frac{x}{x-1}\right)x^{-1}$

7) *The general solution of the differential equation* $x^2y'' + 4xy' + 2y = e^x$ *is given by* **1 point**

- $y = c_1e^{-x} + c_2e^{-2x} + x^{-2}e^x$
- $y = c_1x^{-1} + c_2x^{-2} + x^{-2}e^x$
- $y = c_1x^{-1} + c_2x^{-2} + x^{-1}e^x$
- $y = c_1e^{-x} + c_2e^{-2x} + x^{-1}e^x$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = c_1x^{-1} + c_2x^{-2} + x^{-2}e^x$

8) **1 point**

If $y = e^x$ *is a solution of the differential equation* $y'' - xy' + (x-1)y = 0$, *then its general solution is g*

- $y = c_1e^x + c_2e^x\int e^{(\frac{x^2}{2}-2x)}dx$
- $y = c_1e^x + c_2e^x\int e^{(x^2-2x)}dx$
- $y = c_1e^x + c_2\int e^{(x^2-2x)}dx$

$y = c_1 e^x + c_2 \int e^{(\frac{x^2}{2} - 2x)} dx$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = c_1 e^x + c_2 e^x \int e^{(\frac{x^2}{2} - 2x)} dx$

9) $If\ y = x\ is\ a\ solution\ of\ the\ equation\ x^2 y'' - (x^2 + 2x)y' + (x + 2)y = x^3 e^x,$ *1 point*
$then\ its\ general\ solution\ is\ given\ by$

$y = c_1 + (x + c_2)e^x$

$y = c_1 x + (x^2 + c_2 x)e^x$

$y = c_1 x + (x + c_2)e^x$

$y = c_1 e^x + (x^2 + c_2 x)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = c_1 x + (x^2 + c_2 x)e^x$

10) $Using\ the\ method\ of\ inspection,\ the\ general\ solution\ of\ the$ *1 point*
$differential\ equation\ (x \sin x + \cos x)y'' - (x \cos x)y' + y \cos x = 0\ is\ given\ by$

$y = c_1 \sin x + c_2 x$

$y = c_1 \cos x + c_2 x$

$y = c_1 \sin x + c_2 e^x$

$y = c_1 \cos x + c_2 e^{-x}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = c_1 \cos x + c_2 x$

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