



COMPUTERENGINEE
RINGDEPARTMENT22

Find the Laplace transform $Y(s) = \mathcal{L}\{y(t)\}$ of the solution of the initial value problem

$$y'' - y' + y = \cos(t), \quad y(0) = -1, \quad y'(0) = 1.$$

$$Y(s) = \frac{s^3 - 2s^2 + 2s - 2}{(s^2 + 1)(s^2 - s + 1)} \quad \text{○}$$

$$Y(s) = \frac{-s^3}{(s^2 + 1)(s^2 - s + 1)} \quad \text{○}$$

none of the given answers is true ☐

$$Y(s) = \frac{-s^3 + 2s^2 + 2}{(s^2 + 1)(s^2 - s + 1)} \quad \text{●}$$

$$Y(s) = \frac{s^3 - 2s}{(s^2 + 1)(s^2 - s + 1)} \quad \text{○}$$

سؤال 3

لم يتم الإجابة

الدرجة : 2

علم السؤال

If $W = \begin{vmatrix} y_1 & y_2 \\ f(t) & g(t) \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{-t}(t-2)$ and $y_2 = e^{-t}(t+2)$, then

. $f(t)$ find

$$f(t) = -e^{-t}[t+1] \quad \text{○}$$

$$f(t) = -e^{-t}[t-1] \quad \text{○}$$

none of the given answers is true ☐

$$f(t) = -e^{-t}[t-3] \quad \text{●}$$

$$f(t) = -e^{-t}[t+3] \quad \text{○}$$

سؤال 4

لم يتم الإجابة

الدرجة : 1

علم السؤال

.Find A such that the equation $[x^3 + 2x^2y + xy^2 + 2y^3] + [\frac{2}{3}x^3 + Ax^2y + 6xy^2]\frac{dy}{dx} = 0$ is exact

None of the given answers ☐

$$A = -6 \quad \text{○}$$

$$A = 6 \quad \text{○}$$

$$A = -1 \quad \text{○}$$

$$A = 1 \quad \text{●}$$

سؤال 5

لم يتم الإجابة

الدرجة : 1

علم السؤال

Find the recurrence relation for the series solution of the differential equation

$$x_0 = 0 \text{ about } (x^2 - 3)y'' + 2xy' - 2xy = 0$$

$$a_{n+2} = \frac{[n(n+1)a_n - 2a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots \quad \text{●}$$

$$a_{n+2} = \frac{[n(n+2)a_n - 2a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots \quad \text{○}$$

none of the given answers is true ☐

$$a_{n+2} = \frac{[n(n+2)a_n + 2a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots \quad \text{○}$$

$$a_{n+2} = \frac{[n(n+1)a_n + 2a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots \quad \text{○}$$

سؤال 7

لم يتم الإجابة

الدرجة : 3

علم السؤال

Find the solution of the initial value problem
 $x^2 y'' - 3xy' + 4y = -4, \quad y(1) = -6, \quad y'(1) = -16.$

$y(x) = -1 - 5x^2 - 6x^2 \ln(x)$ ☒

$y(x) = -1 - 5x^2 + 6x^2 \ln(x)$ ☐

none of the given answers is true ☐

$y(x) = -1 + 5x^2 - 6x^2 \ln(x)$ ☐

$y(x) = -1 + 5x^2 + 6x^2 \ln(x)$ ☐

سؤال 1

لم يتم الإجابة

الدرجة : 2

علم السؤال

Find the solution of the initial value problem
 $x^2 y'' - 3xy' + 4y = -4, \quad y(1) = -6, \quad y'(1) = -16.$

$y(x) = -1 - 5x^2 - 6x^2 \ln(x)$ ☐

$y(x) = -1 - 5x^2 + 6x^2 \ln(x)$ ☐

none of the given answers is true ☐

$y(x) = -1 + 5x^2 - 6x^2 \ln(x)$ ☐

$y(x) = -1 + 5x^2 + 6x^2 \ln(x)$ ☐

سؤال 1

لم يتم الإجابة

الدرجة : 2

علم السؤال

Find the general solution of the differential equation
 $25y''' + 9y' = 0$

$y = c_1 e^{3t/5} + c_2 \cos(3t/5) + c_3 \sin(3t/5)$ ☐

$y = c_1 t + c_2 \cos(3t/5) + c_3 \sin(3t/5)$ ☐

$y = c_1 + c_2 \cos(3t/5) + c_3 \sin(3t/5)$ ☒

$y = c_1 + c_2 e^{3t/5} + c_3 e^{-3t/5}$ ☐

None of the given answers is true ☐

سؤال 10

لم يتم الإجابة

الدرجة : 2

علم السؤال

If $y(x) = \sum_{n=0}^{\infty} a_n x^n$ is the series solution of the initial value problem

$$y'' - xy' + (x+3)y = 0, \quad y(0) = 3, \quad y'(0) = 12,$$

. a_4 then find

none of the given answers is true ☐

$$a_4 = \frac{5}{4} \quad \text{○}$$

$$a_4 = \frac{-5}{4} \quad \text{○}$$

$$a_4 = \frac{5}{8} \quad \text{○}$$

$$a_4 = \frac{-5}{8} \quad \text{○}$$

$\mathcal{L}\{u_2(t)f(t-2)\} = \text{If } F(s) = \mathcal{L}\{f(t)\}$ is the Laplace transform of a function $f(t)$, then

$$e^{8s}F(s) \quad \text{○}$$

none of the given answers is true ☐

$$F(s-8) \quad \text{●}$$

$$e^{-8s}F(s) \quad \text{○}$$

$$F(s+8) \quad \text{○}$$

سؤال 2

لم يتم الإجابة

الدرجة : 2

علم السؤال

.Find A such that the equation $[x^3 + 2x^2y + xy^2 + 2y^3] + [\frac{2}{3}x^3 + Ax^2y + 6xy^2]\frac{dy}{dx} = 0$ is exact

None of the given answers ☐

$$A = -6 \quad \text{○}$$

$$A = 6 \quad \text{○}$$

$$A = -1 \quad \text{○}$$

$$A = 1 \quad \text{○}$$

سؤال 5

لم يتم الإجابة

الدرجة : 1

علم السؤال

If $y_p = u_1(t) + \cos(t)u_2(t) + \sin(t)u_3(t)$ is a particular solution of the differential equation $y''' + y' = 3\tan(t)$, $u_3(t)$ then find

$$u_3(t) = -3\cos(t) + 3\ln|\csc(t) + \cot(t)| \quad \text{○}$$

$$u_3(t) = 3\sin(t) - 3\ln|\sec(t) + \tan(t)| \quad \text{●}$$

$$u_3(t) = 3\sin(t) + 3\ln|\sec(t) + \tan(t)| \quad \text{○}$$

none of the given answers is true ☐

$$u_3(t) = 3\cos(t) + 3\ln|\csc(t) + \cot(t)| \quad \text{○}$$

سؤال 12

لم يتم الإجابة

الدرجة : 2

علم السؤال

Find $h(x)$ such that $x \sin(y) - ye^{-x} + h(x) = c$ is the solution of the exact equation

$$[\sin(y) + ye^{-x} + 2 \cos(x)]dx + [x \cos(y) - e^{-x}]dy = 0$$

none of the given answers ☐

$h(x) = -2 \sin(x)$ ☐

$h(x) = -2 \cos(x)$ ☒

$h(x) = 2 \sin(x)$ ☐

$h(x) = 2 \cos(x)$ ☐

سؤال 11

لم يتم الإجابة

الدرجة : 2

علم السؤال

Find the solution of the initial value problem

$$y'' - 6y' + 10y = g(t), y(0) = 0, y'(0) = 0,$$

$$g(t) = \begin{cases} -1, & t < 1, \\ 0, & t \geq 1. \end{cases} \text{ where}$$

where $y(t) = -f(t) + u_1(t)f(t-1)$ ☐

$$f(t) = \frac{1}{10} - \frac{1}{10}e^{-3t} [\cos(t) - 3 \sin(t)]$$

where $y(t) = -f(t) + u_2(t)f(t-2)$ ☐

$$f(t) = \frac{1}{10} - \frac{1}{10}e^{-3t} [\cos(t) + 3 \sin(t)]$$

where $y(t) = -f(t) + u_1(t)f(t-1)$ ☒

$$f(t) = \frac{1}{10} - \frac{1}{10}e^{-3t} [\cos(t) + 3 \sin(t)]$$

where $y(t) = -f(t) + u_2(t)f(t-2)$ ☐

$$f(t) = \frac{1}{10} - \frac{1}{10}e^{-3t} [\cos(t) - 3 \sin(t)]$$

سؤال 8

لم يتم الإجابة

الدرجة : 3

علم السؤال

$y''' - 2y' = -t - 4$. Find a particular solution of the differential equation

$y_p = \frac{1}{4}(t^2 - 8t)$ ☐

$y_p = \frac{1}{4}(t^2 + 8t)$ ☒

$y_p = \frac{1}{4}(t^2 + 4t)$ ☐

none of the given answers is true ☐

$y_p = \frac{1}{4}(t^2 - 4t)$ ☐

سؤال 14

لم يتم الإجابة

الدرجة : 2

علم السؤال

$y^{(4)} - 3y'' - 4y = -4te^{-2t}$. Find the general solution of the differential equation

$y = c_1e^{2t} + c_2e^{-2t} + c_3 \sin(t) + c_4 \cos(t) - \frac{1}{100}(10t^2 - 21t)e^{-2t}$ ☒

none of the given answers is true ☐

$y = c_1e^{2t} + c_2e^{-2t} + c_3 \sin(t) + c_4 \cos(t) - \frac{1}{100}(10t^2 + 21t)e^{-2t}$ ☐

$y = c_1e^{2t} + c_2e^{-2t} + c_3 \sin(t) + c_4 \cos(t) + \frac{1}{100}(10t^2 - 21t)e^{-2t}$ ☐

$y = c_1e^{2t} + c_2e^{-2t} + c_3 \sin(t) + c_4 \cos(t) + \frac{1}{100}(10t^2 + 21t)e^{-2t}$ ☐

سؤال 15

لم يتم الإجابة

الدرجة : 3

علم السؤال

.Transform the homogeneous equation $y' = \frac{y-t}{3y+t}$ to a separable equation

$tv' = \frac{-3v^2 + 1}{3v + 1}$ ☐

$tv' = \frac{3v^2 + 1}{3v + 1}$ ☐

$tv' = \frac{3v^2 - 1}{3v + 1}$ ☐

None of the given answers ☐

$tv' = \frac{-3v^2 - 1}{3v + 1}$ ☒

سؤال 13

لم يتم الإجابة

الدرجة : 1

علم السؤال

Find a suitable form for particular solution of the differential equation

$y^{(4)} - 10y'' + 25y = te^{-\sqrt{5}t} + (t^2 + 1)e^{4t}$.

none of the given answers is true ☐

$y_p = (A_1t + A_0)e^{-\sqrt{5}t} + (B_2t^2 + B_1t + B_0)e^{4t}$ ☐

$y_p = t^2(A_1t + A_0)e^{-\sqrt{5}t} + (B_2t^2 + B_1t + B_0)e^{4t}$ ☒

$y_p = t(A_1t + A_0)e^{-\sqrt{5}t} + (B_2t^2 + B_1t + B_0)e^{4t}$ ☐

$y_p = t(A_1t + A_0)e^{-\sqrt{5}t} + t(B_2t^2 + B_1t + B_0)e^{4t}$ ☐

سؤال 17

لم يتم الإجابة

الدرجة : 2

علم السؤال

$y'' + 2y' + 5y = e^{-t} \sec(2t)$. Find a particular solution of the differential equation

$y_p = \frac{1}{4}e^{-t} [\sin(2t) \ln |\sin(2t)| + 2t \cos(2t)]$ ☒

none of the given answers is true ☐

$y_p = \frac{1}{4}e^{-t} [\cos(2t) \ln |\cos(2t)| + 2t \sin(2t)]$ ☐

$y_p = \frac{1}{4}e^{-t} [\sin(2t) \ln |\cos(2t)| + 2t \cos(2t)]$ ☐

$y_p = \frac{1}{4}e^{-t} [\cos(2t) \ln |\sin(2t)| + 2t \sin(2t)]$ ☐

سؤال 9

لم يتم الإجابة

الدرجة : 2

علم السؤال

. $25y''' + 9y' = 0$ Find the general solution of the differential equation

$y = c_1 e^{3t/5} + c_2 \cos(3t/5) + c_3 \sin(3t/5)$ ☐

سؤال 10

لم يتم الإجابة

الدرجة : 2

.Transform the homogeneous equation $y' = \frac{y-t}{3y+t}$ to a separable equation

$tv' = \frac{-3v^2 + 1}{3v + 1}$ ☐

$tv' = \frac{3v^2 + 1}{3v + 1}$ ☐

$tv' = \frac{3v^2 - 1}{3v + 1}$ ☐

None of the given answers ☐

$tv' = \frac{-3v^2 - 1}{3v + 1}$ ☐

سؤال 13

لم يتم الإجابة

الدرجة : 1

علم السؤال

$y'' + 2y' + 5y = e^{-t} \sec(2t)$. Find a particular solution of the differential equation

$y_p = \frac{1}{4}e^{-t} \left[\sin(2t) \ln |\sin(2t)| + 2t \cos(2t) \right]$ ☐

none of the given answers is true ☐

$y_p = \frac{1}{4}e^{-t} \left[\cos(2t) \ln |\cos(2t)| + 2t \sin(2t) \right]$ ☐

$y_p = \frac{1}{4}e^{-t} \left[\sin(2t) \ln |\cos(2t)| + 2t \cos(2t) \right]$ ☐

$y_p = \frac{1}{4}e^{-t} \left[\cos(2t) \ln |\sin(2t)| + 2t \sin(2t) \right]$ ☐

سؤال 9

لم يتم الإجابة

الدرجة : 2

علم السؤال

$3y^3y'' + 3y^2(y')^2 = 1$ Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation

$\frac{dv}{dy} + \frac{1}{y} v = \frac{1}{3y^3} v^{-1}$ ☐

$\frac{dv}{dy} + \frac{1}{3y} v = \frac{1}{3y^3} v^{-1}$ ☒

none of the given answers is true ☐

$\frac{dv}{dy} - \frac{1}{3y} v = \frac{1}{3y^3} v^{-1}$ ☐

$\frac{dv}{dy} - \frac{1}{y} v = \frac{1}{3y^3} v^{-1}$ ☐

سؤال 16

لم يتم الإجابة

الدرجة : 1

علم السؤال

$y'' - 2y' + 2y = 0$ Which of the following functions is a solution of the equation

$y(t) = -e^t \left[\cos(t) + 5 \sin(t) \right]$ ☒

none of the given answers ☐

$y(t) = -e^{2t} \left[\cos(t) + 5 \sin(t) \right]$ ☐

$y(t) = -e^{-2t} \left[\cos(t) + 5 \sin(t) \right]$ ☐

$y(t) = -e^{-t} \left[\cos(t) + 5 \sin(t) \right]$ ☐

سؤال 20

لم يتم الإجابة

الدرجة : 2

علم السؤال

$f(t) = (t + 2)[u_2(t) - 1]$. Find the Laplace transform $F(s)$ of the function

$F(s) = \frac{-(2s + 1)}{s^2} + \frac{(4s + 1)e^{-2s}}{s^2}$ ☐

$F(s) = \frac{-(2s - 1)}{s^2} + \frac{(4s - 1)e^{-2s}}{s^2}$ ☐

$F(s) = \frac{-(2s + 1)}{s^2} + \frac{(3s + 1)e^{-2s}}{s^2}$ ☒

none of the given answers is true ☐

$F(s) = \frac{-(2s - 1)}{s^2} + \frac{(3s - 1)e^{-2s}}{s^2}$ ☐

سؤال 18

لم يتم الإجابة

الدرجة : 2

علم السؤال

سؤال 19

لم يتم الإجابة

الدرجة : 2

علم السؤال

$y' + 2(x-1)y = 0$ If $y = \sum_{n=0}^{\infty} a_n x^n$, then

$-2a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} - 2a_n + 2a_{n-1}]x^n$ ☒

$\sum_{n=0}^{\infty} [(n+1)a_{n+1} - 2a_n + 2a_{n-1}]x^n$ ☐

none of the given answers is true ☐

$2a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} + 2a_n + 2a_{n-1}]x^n$ ☐

$\sum_{n=0}^{\infty} [(n+1)a_{n+1} + 2a_n + 2a_{n-1}]x^n$ ☐

سؤال 16

لم يتم الإجابة

الدرجة : 1

علم السؤال

. $3y^3 y'' + 3y^2 (y')^2 = 1$ Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation

$\frac{dv}{dy} + \frac{1}{y} v = \frac{1}{3y^3} v^{-1}$ ☐

$\frac{dv}{dy} + \frac{1}{3y} v = \frac{1}{3y^3} v^{-1}$ ☐

none of the given answers is true ☐

$\frac{dv}{dy} - \frac{1}{3y} v = \frac{1}{3y^3} v^{-1}$ ☐

$\frac{dv}{dy} - \frac{1}{y} v = \frac{1}{3y^3} v^{-1}$ ☐

If $y(x) = \sum_{n=0}^{\infty} a_n x^n$ is the series solution of the initial value problem

$y'' + xy' + (x-3)y = 0, \quad y(0) = 18, \quad y'(0) = -6,$

then find a_4 .

Select one:

☐ $a_4 = \frac{-11}{3}$

☐ $a_4 = \frac{11}{3}$

☐ none of the given answers is true

☐ $a_4 = \frac{11}{4}$

☐ $a_4 = \frac{-11}{4}$

☐ none of the given answers

Find a suitable form for particular solution of the differential equation

$$y^{(4)} - 8y'' + 16y = te^{2t} + (t^2 + 1)e^{3t}.$$

Select one:

- ☐ $y_p = t(A_1t + A_0)e^{2t} + t(B_2t^2 + B_1t + B_0)e^{3t}$
- ☐ $y_p = t^2(A_1t + A_0)e^{2t} + (B_2t^2 + B_1t + B_0)e^{3t}$
- ☐ none of the given answers is true
- ☐ $y_p = (A_1t + A_0)e^{2t} + (B_2t^2 + B_1t + B_0)e^{3t}$
- ☐ $y_p = t(A_1t + A_0)e^{2t} + (B_2t^2 + B_1t + B_0)e^{3t}$

If $y(x) = \sum_{n=0}^{\infty} a_n x^n$ is the series solution of the initial value problem

☐ $tv' = \frac{5v^2 - 3v + 1}{5v - 1}$

18

Find the solution of the initial value problem

$$x^2 y'' + 5xy' + 4y = -4, \quad y(1) = -3, \quad y'(1) = 12.$$

Select one:

- ☐ $y(x) = -1 + 2x^{-2} - 8x^{-2} \ln(x)$
- ☐ none of the given answers is true
- ☐ $y(x) = -1 - 2x^{-2} + 8x^{-2} \ln(x)$
- ☐ $y(x) = -1 + 2x^{-2} + 8x^{-2} \ln(x)$
- ☐ $y(x) = -1 - 2x^{-2} - 8x^{-2} \ln(x)$

tion 19

yet

Find the general solution of the differential equation $4y^{(4)} + 35y'' - 9y = 74(1$

☐ $y(x) = -1 - 2x^{-2} - 8x^{-2} \ln(x)$

Find the general solution of the differential equation $4y^{(4)} + 35y'' - 9y = 74(1+t)e^{t/2}$.

Select one:

- ☐ none of the given answers is true
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 + 8t)e^{t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 + 8t)e^{t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 - 8t)e^{t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 - 8t)e^{t/2}$

Find a particular solution of the differential equation $y''' - 2y' = t + 5$.

Differential Equations (Math 2302)

My courses

MATH2302-671

الامتحان النهائي

Final Exam

Which of the following functions is a solution of the equation $y'' - 4y' + 5y = 0$.

Select one:

- ☐ $y(t) = e^{2t} [2 \sin(t) - 3 \cos(t)]$
- ☐ $y(t) = e^{t} [2 \sin(t) - 3 \cos(t)]$
- ☐ none of the given answers
- ☐ $y(t) = e^{-2t} [2 \sin(t) - 3 \cos(t)]$
- ☐ $y(t) = e^{-t} [2 \sin(t) - 3 \cos(t)]$

Transform the homogeneous equation $y' = \frac{-4y - t}{5y - t}$ to a separable equation.

Find a particular solution of the differential equation $y''' - 2y' = t + 5$.

Select one:

- ☐ $y_p = -\frac{1}{4}(t^2 - 10t)$
- ☐ $y_p = -\frac{1}{4}(t^2 - 5t)$
- ☐ $y_p = -\frac{1}{4}(t^2 + 10t)$
- ☐ $y_p = -\frac{1}{4}(t^2 + 5t)$
- ☐ none of the given answers is true

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My courses MATH2302-671 الامتحان النهائي Final Exam

Find the Laplace transform $Y(s) = \mathcal{L}\{y(t)\}$ of the solution of the initial value problem

$$y'' - 2y' + y = -1, \quad y(0) = -4, \quad y'(0) = 0.$$

Select one:

- ☐ $Y(s) = \frac{-4s^2 + 8s + 1}{s(s^2 - 2s + 1)}$
- ☐ none of the given answers is true
- ☐ $Y(s) = \frac{4s^2 - 8s + 1}{s(s^2 - 2s + 1)}$
- ☒ $Y(s) = \frac{-4s^2 + 8s - 1}{s(s^2 - 2s + 1)}$
- ☐ $Y(s) = \frac{4s^2 - 8s - 1}{s(s^2 - 2s + 1)}$

$(\cos(t) + \sin(2t))u_2(t)$ is a particular solution of the differential equation

- ☐ $u_1(t) = \frac{1}{2} \ln |\cos(2t)|$
☐ none of the given answers is true

Find $h(x)$ such that $x \sin(y) + ye^{-x} + h(x) = c$ is the solution of the exact equation

$$[\sin(y) - ye^{-x} + 3 \cos(x)]dx + [x \cos(y) + e^{-x}]dy = 0$$

Select one:

- ☐ $h(x) = -3 \sin(x)$
☐ $h(x) = -3 \cos(x)$
☐ $h(x) = 3 \cos(x)$
☐ $h(x) = 3 \sin(x)$
☐ none of the given answers

Find a suitable form for particular solution of the differential equation

- ☐ $Y(s) = \frac{-4s^2 + 8s - 1}{s(s^2 - 2s + 1)}$
☐ $Y(s) = \frac{4s^2 - 8s - 1}{s(s^2 - 2s + 1)}$

If $y_p = u_1(t) + \cos(2t)u_2(t) + \sin(2t)u_3(t)$ is a particular solution of the differential equation $y''' + 4y' = 4 \cot(2t)$, then find $u_1(t)$.

Select one:

- ☐ $u_1(t) = -\frac{1}{2} \ln |\sin(2t)|$
☐ $u_1(t) = -\frac{1}{2} \ln |\cos(2t)|$
☐ $u_1(t) = \frac{1}{2} \ln |\sin(2t)|$
☐ $u_1(t) = \frac{1}{2} \ln |\cos(2t)|$
☐ none of the given answers is true

Find $h(x)$ such that $x \sin(y) + ye^{-x} + h(x) = c$ is the solution of the exact equation

$$\circ \quad tv' = \frac{5v^2 - 3v + 1}{5v - 1}$$

18

Find the solution of the initial value problem

$$x^2 y'' + 5xy' + 4y = -4, \quad y(1) = -3, \quad y'(1) = 12.$$

Select one:

- ☐ $y(x) = -1 + 2x^{-2} - 8x^{-2} \ln(x)$
- ☐ none of the given answers is true
- ☐ $y(x) = -1 - 2x^{-2} + 8x^{-2} \ln(x)$
- ☐ $y(x) = -1 + 2x^{-2} + 8x^{-2} \ln(x)$
- ☐ $y(x) = -1 - 2x^{-2} - 8x^{-2} \ln(x)$

tion 19

et

Find the general solution of the differential equation $4y^{(4)} + 35y'' - 9y = 74(1$

$$\circ \quad F(s) = \frac{2 - (s - 1)}{s^2} + \frac{2(6s - 1)e^{-8s}}{s^2}$$

Find a particular solution of the differential equation $y'' - 4y' + 29y = 3e^{2t} \csc(5t)$.

Select one:

- ☐ $y_p = \frac{3}{25} e^{2t} \left[\sin(5t) \ln |\sin(5t)| - 5t \cos(5t) \right]$
- ☐ none of the given answers is true
- ☐ $y_p = \frac{3}{25} e^{2t} \left[\cos(5t) \ln |\sin(5t)| - 5t \sin(5t) \right]$
- ☐ $y_p = \frac{3}{25} e^{2t} \left[\cos(5t) \ln |\cos(5t)| - 5t \sin(5t) \right]$
- ☐ $y_p = \frac{3}{25} e^{2t} \left[\sin(5t) \ln |\cos(5t)| - 5t \cos(5t) \right]$

Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation $3yy'' -$

☐ $\left(\displaystyle F(s)=\frac{1}{s}\Big(e^{-s}+e^{-3s}\Big)\right)$

☐ none of the given answers is true

Find the general solution of the differential equation $y''' - 2y'' + 26y' = 0$.

Select one:

☐ $y(t) = c_1 + e^{2t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ $y(t) = c_1 + e^{-2t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ $y(t) = c_1 + e^{-t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ none of the given answers

☒ $y(t) = c_1 + e^t [c_2 \cos(5t) + c_3 \sin(5t)]$

If $W = \begin{vmatrix} y_1 & y_2 \\ \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{4t} \sin(4t)$ and $y_2 = e^{4t} \cos(4t)$

Ordinary Differential Equations (Math 2302)

Dashboard

My courses

MATH2302-671

الامتحان النهائي

Final Exam

Question 6

Find the Laplace transform $F(s)$ of the function $f(t) = 2(t-1)[u_8(t) - 1]$.

Select one:

☐ $F(s) = \frac{2(s-1)}{s^2} + \frac{2(6s+1)e^{-8s}}{s^2}$

☐ none of the given answers is true

☐ $F(s) = \frac{2-(s-1)}{s^2} + \frac{2(7s-1)e^{-8s}}{s^2}$

☐ $F(s) = \frac{2(s-1)}{s^2} + \frac{2(7s+1)e^{-8s}}{s^2}$

☐ $F(s) = \frac{2-(s-1)}{s^2} + \frac{2(6s-1)e^{-8s}}{s^2}$

Question 7

yet

Find a particular solution of the differential equation $y'' - 4y' + 29y = 3e^{2t} \csc(5t)$.

Find the recurrence relation for the series solution of the differential equation $(x^2 + 3)y'' + 5xy' + xy = 0$ about $x_0 = 0$.

Select one:

- ☐ $a_{n+2} = -\frac{[n(n+3)a_n - a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+4)a_n - a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ none of the given answers is true
- ☐ $a_{n+2} = -\frac{[n(n+4)a_n + a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+3)a_n + a_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots$

10

Find A such that the equation $[x^3 + 6x^2y + xy^2 + y^3] + [Ax^3 + x^2y + 3xy^2 + y^3] \frac{dy}{dx} = 0$

☐ none of the given answers

☒ $y(t) = c_1 + e^t [c_2 \cos(5t) + c_3 \sin(5t)]$

If $W = \begin{vmatrix} y_1 & y_2 \\ f(t) & g(t) \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{4t} \sin(4t)$ and $y_2 = e^{4t} \cos(4t)$, then find $g(t)$.

Select one:

- ☐ $g(t) = 4e^{4t} [\cos(4t) + \sin(4t)]$
- ☐ $g(t) = 4e^{4t} [\cos(4t) - \sin(4t)]$
- ☐ $g(t) = 4e^{4t} [\sin(4t) - \cos(4t)]$
- ☐ none of the given answers is true
- ☐ $g(t) = -4e^{4t} [\sin(4t) + \cos(4t)]$

Find the solution of the initial value problem

$$y'' - 8y' + 17y = g(t), y(0) = 0, y'(0) = 0,$$

$$a_{n+2} = -\frac{[u_n + u_{n-1}]}{3(n+1)(n+2)}, \quad n = 2, 3, \dots$$

Find A such that the equation $[x^3 + 6x^2y + xy^2 + y^3] + [Ax^3 + x^2y + 3xy^2 + y^3]\frac{dy}{dx} = 0$ is exact.

Select one:

- ☐ $A = 1$
- ☐ $A = -1$
- ☐ None of the given answers
- ☐ $A = -2$
- ☐ $A = 2$

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Chapter 1 ▶

touch

Differential Equations (math 2302)

My courses MATH2302-671 الامتحان النهائي Final Exam

Find the Laplace transform of $f(t) = u_3(t) - u_1(t)$.

Select one:

- ☐ $F(s) = \frac{1}{s} (e^{-3s} - e^{-s})$
- ☐ $F(s) = \frac{1}{s} (e^{-s} - e^{-3s})$
- ☐ $\left(\displaystyle F(s) = -\frac{1}{s} (e^{-s} + e^{-3s}) \right)$
- ☐ $\left(\displaystyle F(s) = \frac{1}{s} (e^{-s} + e^{-3s}) \right)$
- ☐ none of the given answers is true

Find the general solution of the differential equation $y''' - 2y'' + 26y' = 0$.

☐ none of the given answers is true

If $y = \sum_{n=0}^{\infty} a_n x^n$, then $y' + (2x + 1)y =$

Select one:

☒ $a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} + a_n + 2a_{n-1}]x^n$

☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} + a_n + 2a_{n-1}]x^n$

☐ $-a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} - a_n + 2a_{n-1}]x^n$

☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} - a_n + 2a_{n-1}]x^n$

☐ none of the given answers is true

$$f(t) = \frac{1}{17} - \frac{1}{17}e^{-t} [\cos(t) + 4\sin(t)]$$

- ☐ none of the given answers is true

If $y = \sum_{n=0}^{\infty} a_n x^n$, then $y' + (2x + 1)y =$

Select one:

☒ $a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} + a_n + 2a_{n-1}]x^n$

☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} + a_n + 2a_{n-1}]x^n$

☐ $-a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} - a_n + 2a_{n-1}]x^n$

☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} - a_n + 2a_{n-1}]x^n$

- ☐ none of the given answers is true

$$y_p = \frac{e^{2t}}{25} \left[\sin(5t) \ln |\cos(5t)| - 5t \cos(5t) \right]$$

Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation $3yy'' - (y')^3 = 1$.

Select one:

- ☐ $\frac{dv}{dy} + \frac{1}{3y} v^2 = \frac{1}{3y} v^{-1}$
- ☐ none of the given answers is true
- ☐ $\frac{dv}{dy} - \frac{2}{3y} v^2 = \frac{1}{3y} v^{-1}$
- ☐ $\frac{dv}{dy} - \frac{1}{3y} v^2 = \frac{1}{3y} v^{-1}$
- ☐ $\frac{dv}{dy} + \frac{2}{3y} v^2 = \frac{1}{3y} v^{-1}$

Find the recurrence relation for the series solution of the differential equation

$$(x^2 + 2x + 2)y'' + 5xy' + 2y = 0, \quad y(0) = 0, \quad y'(0) = 0$$

☐ $F(s) = \frac{1}{s} (e^{-s} + e^{-3s})$

☐ $F(s) = \frac{1}{s} (e^{-s} + e^{-3s})$

☐ none of the given answers is true

Find the general solution of the differential equation $y''' - 2y'' + 26y' = 0$.

Select one:

☐ $y(t) = c_1 + e^{2t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ $y(t) = c_1 + e^{-2t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ $y(t) = c_1 + e^{-t} [c_2 \cos(5t) + c_3 \sin(5t)]$

☐ none of the given answers

☐ $y(t) = c_1 + e^t [c_2 \cos(5t) + c_3 \sin(5t)]$

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If $W = \begin{vmatrix} y_1 & y_2 \\ f(t) & g(t) \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{4t} \sin(4t)$ then find $g(t)$.

Question 4

Not yet answered

Marked out of 3

Flag question

Find the solution of the initial value problem

$$y'' - 8y' + 17y = g(t), y(0) = 0, y'(0) = 0,$$

$$\text{where } g(t) = \begin{cases} -1, & t < 2, \\ 0, & t \geq 2. \end{cases}$$

Select one:

- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where $f(t) = \frac{1}{17} - \frac{1}{17}e^{-4t}[\cos(t) + 4\sin(t)]$
- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where $f(t) = \frac{1}{17} - \frac{1}{17}e^{4t}[\cos(t) - 4\sin(t)]$
- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where $f(t) = \frac{1}{17} - \frac{1}{17}e^{4t}[\cos(t) - 4\sin(t)]$
- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where $f(t) = \frac{1}{17} - \frac{1}{17}e^{-4t}[\cos(t) + 4\sin(t)]$
- ☐ none of the given answers is true

Find the Laplace transform of $f(t) = u_1(t) - 2u_2(t)$.

Select one:

- ☐ none of the given answers is true
- ☒ $F(s) = \frac{1}{s}(e^{-s} - 2e^{-2s})$
- ☐ $F(s) = -\frac{1}{s}(e^{-s} + 2e^{-2s})$
- ☐ $F(s) = \frac{1}{s}(e^{-s} + 2e^{-2s})$
- ☐ $F(s) = \frac{1}{s}(2e^{-2s} - e^{-s})$

Find a suitable form for particular solution of the differential equation

$$y^{(4)} - 6y'' + 9y = te^{-\sqrt{3}t} + (t^2 + 1)e^{3t}.$$

Select one:

- ☐ $y_p = (A_1t + A_0)e^{-\sqrt{3}t} + (B_2t^2 + B_1t + B_0)e^{3t}$
- ☐ none of the given answers is true
- ☐ $y_p = t(A_1t + A_0)e^{-\sqrt{3}t} + (B_2t^2 + B_1t + B_0)e^{3t}$
- ☒ $y_p = t^2(A_1t + A_0)e^{-\sqrt{3}t} + (B_2t^2 + B_1t + B_0)e^{3t}$
- ☐ $y_p = t(A_1t + A_0)e^{-\sqrt{3}t} + t(B_2t^2 + B_1t + B_0)e^{3t}$

If $W = \begin{vmatrix} y_1 & y_2 \\ f(t) & g(t) \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{-4t}(t - 1)$ and $y_2 = e^{-4t}(t + 1)$, then find $g(t)$.

Select one:

- ☐ $g(t) = -e^{-4t}[4t - 5]$
- ☐ $g(t) = -e^{-4t}[4t + 5]$
- ☐ $g(t) = -e^{-4t}[4t - 3]$
- ☐ none of the given answers is true
- ☒ $g(t) = -e^{-4t}[4t + 3]$

Find the Laplace transform $Y(s) = \mathcal{L}\{y(t)\}$ of the solution of the initial value problem

$$y'' + y' - y = \sin(t), \quad y(0) = 3, \quad y'(0) = 3.$$

Select one:

- ☒ none of the given answers is true
- ☐ $Y(s) = \frac{-3s^3 + 4s^2 - 3s - 2}{(s^2 + 1)(s^2 + 2s - 1)}$
- ☐ $Y(s) = \frac{3s^3 + 9s^2 + 3s + 10}{(s^2 + 1)(s^2 + 2s - 1)}$
- ☐ $Y(s) = \frac{-3s^3 - 8s^2 - 3s - 7}{(s^2 + 1)(s^2 + 2s - 1)}$
- ☐ $Y(s) = \frac{3s^3 + 3s^2 - 3s + 4}{(s^2 + 1)(s^2 + 2s - 1)}$

If $y = \sum_{n=0}^{\infty} a_n (x-1)^n$, then $y' + (x+1)y =$

Select one:

- ☒ $2a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} + 2a_n + a_{n-1}](x-1)^n$
- ☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} - 2a_n + a_{n-1}](x-1)^n$
- ☐ $-2a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} - 2a_n + a_{n-1}](x-1)^n$
- ☐ none of the given answers is true
- ☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} + 2a_n + a_{n-1}](x-1)^n$

Find the general solution of the differential equation $36y''' + 24y'' + 13y' = 0$.

Select one:

- ☒ $y(t) = c_1 + e^{-t/3} [c_2 \cos(t/2) + c_3 \sin(t/2)]$
- ☐ $y(t) = c_1 + e^{-t/3} [c_2 \cos(t/2) + c_3 \sin(t/2)]$
- ☐ $y(t) = c_1 + e^{t/3} [c_2 \cos(t/2) + c_3 \sin(t/2)]$
- ☐ $y(t) = c_1 + e^{t/3} [c_2 \cos(t/2) + c_3 \sin(t/2)]$
- ☐ none of the given answers

Find the Laplace transform $F(s)$ of the function $f(t) = 2(t-2)[u_{10}(t) - 1]$.

Select one:

- ☐ $F(s) = \frac{2 - (2s - 1)}{s^2} + \frac{2(7s - 1)e^{-10s}}{s^2}$
- ☒ $F(s) = \frac{2(2s - 1)}{s^2} + \frac{2(8s + 1)e^{-10s}}{s^2}$
- ☐ none of the given answers is true
- ☐ $F(s) = \frac{2(2s - 1)}{s^2} + \frac{2(7s + 1)e^{-10s}}{s^2}$
- ☐ $F(s) = \frac{2 - (2s - 1)}{s^2} + \frac{2(8s - 1)e^{-10s}}{s^2}$

Which of the following functions is a solution of the equation $y'' - 2y' + 2y = 0$.

Select one:

- ☐ $y(t) = e^{-2t} [3 \sin(t) - 3 \cos(t)]$
- ☒ $y(t) = e^t [3 \sin(t) - 3 \cos(t)]$
- ☐ $y(t) = e^{-t} [3 \sin(t) - 3 \cos(t)]$
- ☐ none of the given answers
- ☐ $y(t) = e^{2t} [3 \sin(t) - 3 \cos(t)]$

Find a particular solution of the differential equation $y''' - 2y' = -7t - 3$.

Select one:

- ☐ $y_p = \frac{1}{4}(7t^2 + 3t)$
- ☒ $y_p = \frac{1}{4}(7t^2 + 6t)$
- ☐ none of the given answers is true
- ☐ $y_p = \frac{1}{4}(7t^2 - 3t)$
- ☐ $y_p = \frac{1}{4}(7t^2 - 6t)$

Find $h(y)$ such that $x \sin(y) + ye^x + h(y) = c$ is the solution of the exact equation

$$[\sin(y) + ye^x]dx + [x \cos(y) + e^x + \sin(y)]dy = 0$$

Select one:

- ☒ $h(y) = -\cos(y)$
- ☐ $h(y) = \cos(y)$
- ☐ none of the given answers
- ☐ $h(y) = -\sin(y)$
- ☐ $h(y) = \sin(y)$

Question 11

Not yet answered

Marked out of 3

Flag question

Find the recurrence relation for the series solution of the differential equation $(x^2 + 1)y'' + 4xy' + 2xy = 0$ about $x_0 = 0$.

Select one:

- ☐ none of the given answers is true
- ☐ $a_{n+2} = -\frac{[n(n+2)a_n - 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+3)a_n - 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☒ $a_{n+2} = -\frac{[n(n+2)a_n + 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+3)a_n + 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$

Question 12

Not yet answered

Marked out of 1

Flag question

Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation $2yy'' - 5(y')^3 = 1$.

Select one:

- ☐ $\frac{dv}{dy} + \frac{5}{2y}v^2 = \frac{1}{2y}v^{-1}$
- ☐ none of the given answers is true
- ☒ $\frac{dv}{dy} - \frac{5}{2y}v^2 = \frac{1}{2y}v^{-1}$
- ☐ $\frac{dv}{dy} + \frac{1}{2y}v^2 = \frac{1}{2y}v^{-1}$
- ☐ $\frac{dv}{dy} - \frac{1}{2y}v^2 = \frac{1}{2y}v^{-1}$

Question 16

Not yet answered

Marked out of 3

Flag question

Find the general solution of the differential equation $4y^{(4)} + 35y'' - 9y = 74(1-t)e^{-t/2}$.

Select one:

- ☐ none of the given answers is true
- ☒ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 - 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 + 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 + 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 - 8t)e^{-t/2}$

Question 17

Not yet answered

Marked out of 2

Flag question

If $f(t) = \mathcal{L}^{-1}\{F(s)\}$ is the Laplace inverse transform of a function $F(s)$, then $\mathcal{L}^{-1}\{F(s-6)\} =$

Select one:

- ☐ $u_6(t)f(t+6)$
- ☐ none of the given answers is true
- ☐ $e^{-6t}f(t)$
- ☐ $u_6(t)f(t-6)$
- ☒ $e^{6t}f(t)$

Question 11

Not yet answered

Marked out of 3

Flag question

Find the recurrence relation for the series solution of the differential equation $(x^2 + 1)y'' + 4xy' + 2xy = 0$ about $x_0 = 0$.

Select one:

- ☐ none of the given answers is true
- ☐ $a_{n+2} = -\frac{[n(n+2)a_n - 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+3)a_n - 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+2)a_n + 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$
- ☐ $a_{n+2} = -\frac{[n(n+3)a_n + 2a_{n-1}]}{(n+1)(n+2)}, \quad n = 2, 3, \dots$

Question 12

Not yet answered

Marked out of 1

Flag question

Find the first order equation for v if $y' = v(y)$ and y satisfies the differential equation $2yy'' - 5(y')^3 = 1$.

Select one:

- ☐ $\frac{dv}{dy} + \frac{5}{2y} v^2 = \frac{1}{2y} v^{-1}$
- ☐ none of the given answers is true
- ☐ $\frac{dv}{dy} - \frac{5}{2y} v^2 = \frac{1}{2y} v^{-1}$
- ☐ $\frac{dv}{dy} + \frac{1}{2y} v^2 = \frac{1}{2y} v^{-1}$
- ☐ $\frac{dv}{dy} - \frac{1}{2y} v^2 = \frac{1}{2y} v^{-1}$

Find the Laplace transform $F(s)$ of the function $f(t) = (t - 3)[u_8(t) - 1]$.

Select one:

- ☐ $F(s) = \frac{-(3s-1)}{s^2} + \frac{(4s-1)e^{-8s}}{s^2}$
- ☐ $F(s) = \frac{(3s-1)}{s^2} + \frac{(5s+1)e^{-8s}}{s^2}$
- ☐ $F(s) = \frac{(3s-1)}{s^2} + \frac{(4s+1)e^{-8s}}{s^2}$
- ☐ none of the given answers is true
- ☒ $F(s) = \frac{-(3s-1)}{s^2} + \frac{(5s-1)e^{-8s}}{s^2}$

Question 20

Not yet answered
Marked out of 3

Flag question

If $y(x) = \sum_{n=0}^{\infty} a_n x^n$ is the series solution of the initial value problem

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

then find a_4 .

Select one:

- ☐ $a_4 = \frac{-11}{6}$
- ☐ none of the given answers is true
- ☐ $a_4 = \frac{11}{6}$
- ☐ $a_4 = \frac{-11}{3}$
- ☐ $a_4 = \frac{11}{3}$

Question 16

Not yet answered
Marked out of 3

Flag question

Find the general solution of the differential equation $4y^{(4)} + 35y'' - 9y = 74(1-t)e^{-t/2}$.

Select one:

- ☐ none of the given answers is true
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 - 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) + \frac{1}{37}(37t^2 + 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 + 8t)e^{-t/2}$
- ☐ $y = c_1 e^{t/2} + c_2 e^{-t/2} + c_3 \sin(3t) + c_4 \cos(3t) - \frac{1}{37}(37t^2 - 8t)e^{-t/2}$

Question 17

Not yet answered
Marked out of 2

Flag question

If $f(t) = \mathcal{L}^{-1}\{F(s)\}$ is the Laplace inverse transform of a function $F(s)$, then $\mathcal{L}^{-1}\{F(s-6)\} =$

Select one:

- ☐ $u_6(t)f(t+6)$
- ☐ none of the given answers is true
- ☐ $e^{-6t}f(t)$
- ☐ $u_6(t)f(t-6)$
- ☐ $e^{6t}f(t)$

Question 5

Not yet answered
Marked out of 2

Flag question

If $y_p = u_1(t) + \cos(t/2)u_2(t) + \sin(t/2)u_3(t)$ is a particular solution of the differential equation $4y''' + y' = \frac{1}{8}\cot(t/2)$, then find $u_3(t)$.

Select one:

- ☐ $u_3(t) = \cos(t/2)$
- ☐ none of the given answers is true
- ☐ $u_3(t) = -\cos(t/2)$
- ☐ $u_3(t) = \sin(t/2)$
- ☐ $u_3(t) = -\sin(t/2)$

Previous activity

مجموعة التمرينات

Jump to...

Question 15

Not yet answered

Marked out of 1

Flag question

Find the Laplace transform $F(s)$ of the function $f(t) = (t-3)[u_8(t) - 1]$.

Select one:

- ☐ $F(s) = \frac{-(3s-1)}{s^2} + \frac{(4s-1)e^{-8s}}{s^2}$
- ☐ $F(s) = \frac{(3s-1)}{s^2} + \frac{(5s+1)e^{-8s}}{s^2}$
- ☐ $F(s) = \frac{(3s-1)}{s^2} + \frac{(4s+1)e^{-8s}}{s^2}$
- ☐ none of the given answers is true
- ☐ $F(s) = \frac{-(3s-1)}{s^2} + \frac{(5s-1)e^{-8s}}{s^2}$

Question 18

Not yet answered

Marked out of 1

Flag question

if $W = \begin{vmatrix} y_1 & y_2 \\ f(t) & g(t) \end{vmatrix}$ is the Wronskian determinant of the functions $y_1 = e^{2t} \sin(t)$ and $y_2 = e^{2t} \cos(t)$, then find $g(t)$.

Select one:

- ☐ $g(t) = e^{2t}[2 \cos(t) + \sin(t)]$
- ☐ $g(t) = -e^{2t}[\sin(t) + 2 \cos(t)]$
- ☐ none of the given answers is true
- ☐ $g(t) = e^{2t}[2 \cos(t) - \sin(t)]$
- ☐ $g(t) = e^{2t}[\sin(t) - 2 \cos(t)]$

Question 19

Not yet answered

Marked out of 2

Flag question

if $y = \sum_{n=0}^{\infty} a_n x^n$, then $y' - (3x+4)y =$

Select one:

- ☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} + 4a_n - 3a_{n-1}]x^n$
- ☐ $4a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} + 4a_n - 3a_{n-1}]x^n$
- ☐ $\sum_{n=0}^{\infty} [(n+1)a_{n+1} - 4a_n - 3a_{n-1}]x^n$
- ☐ none of the given answers is true
- ☐ $-4a_0 + a_1 + \sum_{n=1}^{\infty} [(n+1)a_{n+1} - 4a_n - 3a_{n-1}]x^n$

Question 6

Answer saved

Marked out of 2

Flag question

Find the solution of the initial value problem

$$x^2 y'' - 3xy' + 4y = -4, \quad y(1) = -5, \quad y'(1) = -4.$$

Select one:

- ☐ none of the given answers is true
- ☒ $y(x) = -1 + 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 - 4x^2 + 4x^2 \ln(x)$
- ☐ $y(x) = -1 - 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 + 4x^2 + 4x^2 \ln(x)$

Question 1

Not yet answered

Marked out of 2

Flag question

Question 2

Not yet answered

Marked out of 2

Flag question

Question 3

Not yet answered

Marked out of 2

Flag question

Question 13

Not yet answered

Marked out of 2

Flag question

Question 14

Not yet answered

Marked out of 2

Flag question

Find a suitable form for particular solution of the differential equation

$$y^{(4)} - 8y'' + 16y = te^{-2t} + (t^2 + 1)e^{-6t}.$$

Select one:

☐ none of the given answers is true
☐ $y_p = t(A_1 t + A_0)e^{-2t} + t(B_2 t^2 + B_1 t + B_0)e^{-6t}$
☐ $y_p = (A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$
☐ $y_p = t^2(A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$
☐ $y_p = t(A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$

Which of the following functions is a solution of the equation $y'' - 2y' + 2y = 0$.

Select one:

☐ $y(t) = e^t [2 \cos(t) - 3 \sin(t)]$
☐ $y(t) = e^{-t} [2 \cos(t) - 3 \sin(t)]$
☐ $y(t) = e^{2t} [2 \cos(t) - 3 \sin(t)]$
☐ $y(t) = e^{-2t} [2 \cos(t) - 3 \sin(t)]$
☐ none of the given answers

Find the solution of the initial value problem

$$y'' + y' + y = \sin(t), \quad y(0) = -1, \quad y'(0) = 4.$$

Select one:

☐ $Y(s) = \frac{s^3 + 6s^2 + s + 7}{(s^2 + 1)(s^2 + 2s + 1)}$
☐ none of the given answers is true
☐ $Y(s) = \frac{-s^3 + 2s^2 - s + 3}{(s^2 + 1)(s^2 + 2s + 1)}$
☐ $Y(s) = \frac{-s^3 - 6s^2 - s - 5}{(s^2 + 1)(s^2 + 2s + 1)}$
☐ $Y(s) = \frac{s^3 - 2s^2 - s - 1}{(s^2 + 1)(s^2 + 2s + 1)}$

Find the general solution of the differential equation $9y''' + 18y'' + 10y' = 0$.

Select one:

☐ none of the given answers
☐ $y(t) = c_1 + e^{t/3} [c_2 \cos(t) + c_3 \sin(t)]$
☐ $y(t) = c_1 + e^{t/3} [c_2 \cos(t) + c_3 \sin(t)]$
☐ $y(t) = c_1 + e^{-t/3} [c_2 \cos(t) + c_3 \sin(t)]$
☐ $y(t) = c_1 + e^{-t/3} [c_2 \cos(t) + c_3 \sin(t)]$

Question 3
Not yet answered
Marked out of 1
Flag question

Find the solution of the initial value problem

$$y'' + 10y' + 26y = g(t), y(0) = 0, y'(0) = 0,$$

where $g(t) = \begin{cases} -1, & t < 1, \\ 0, & t \geq 1. \end{cases}$

Select one:

- ☐ $y(t) = -f(t) + u_0(t)f(t-2)$ where $f(t) = \frac{1}{26} - \frac{1}{26}e^{2t} [\cos(t) - 5\sin(t)]$
- ☐ $y(t) = -f(t) + u_0(t)f(t-2)$ where $f(t) = \frac{1}{26} - \frac{1}{26}e^{-2t} [\cos(t) + 5\sin(t)]$
- ☐ $y(t) = -f(t) + u_1(t)f(t-1)$ where $f(t) = \frac{1}{26} - \frac{1}{26}e^{2t} [\cos(t) - 5\sin(t)]$
- ☐ $y(t) = -f(t) + u_1(t)f(t-1)$ where $f(t) = \frac{1}{26} - \frac{1}{26}e^{-2t} [\cos(t) + 5\sin(t)]$
- ☐ none of the given answers is true

Question 4
Not yet answered
Marked out of 1
Flag question

Find $h(y)$ such that $x \sin(y) + ye^x + h(y) = c$ is the solution of the exact equation

$$[\sin(y) + ye^x]dx + [x \cos(y) + e^x - 3 \sin(y)]dy = 0$$

Select one:

- ☐ $h(y) = -3 \sin(y)$
- ☐ $h(y) = 3 \cos(y)$
- ☐ none of the given answers
- ☐ $h(y) = 3 \sin(y)$
- ☐ $h(y) = -3 \cos(y)$

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Question 1
Not yet answered
Marked out of 2
Flag question

Find a suitable form for particular solution of the differential equation

$$y^{(4)} - 8y'' + 16y = te^{-2t} + (t^2 + 1)e^{-6t}.$$

Select one:

- ☐ none of the given answers is true
- ☐ $y_p = t(A_1 t + A_0)e^{-2t} + t(B_2 t^2 + B_1 t + B_0)e^{-6t}$
- ☒ $y_p = (A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$
- ☐ $y_p = t^2(A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$
- ☐ $y_p = t(A_1 t + A_0)e^{-2t} + (B_2 t^2 + B_1 t + B_0)e^{-6t}$

Question 2
Not yet answered
Marked out of 2
Flag question

Which of the following functions is a solution of the equation $y'' - 2y' + 2y = 0$.

Select one:

- ☒ $y(t) = e^t [2 \cos(t) - 3 \sin(t)]$
- ☐ $y(t) = e^{-t} [2 \cos(t) - 3 \sin(t)]$
- ☐ $y(t) = e^{2t} [2 \cos(t) - 3 \sin(t)]$
- ☐ $y(t) = e^{-2t} [2 \cos(t) - 3 \sin(t)]$
- ☐ none of the given answers

Question 6

Not yet answered

Marked out of 2

Flag question

Find the solution of the initial value problem

$$x^2 y'' - 3xy' + 4y = -4, \quad y(1) = -5, \quad y'(1) = -4.$$

Select one:

- ☐ none of the given answers is true
- ☐ $y(x) = -1 + 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 - 4x^2 + 4x^2 \ln(x)$
- ☒ $y(x) = -1 - 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 + 4x^2 + 4x^2 \ln(x)$

Question 7

Not yet answered

Marked out of 1

Flag question

Find A such that the equation $[x^3 + 12x^2y + xy^2 + y^3] + [Ax^3 + x^2y + 3xy^2 + y^3] \frac{dy}{dx} = 0$ is exact.

Select one:

- ☐ $A = -2$
- ☐ $A = 2$
- ☐ None of the given answers
- ☐ $A = -4$
- ☒ $A = 4$

Question 9

Not yet answered

Marked out of 1

Flag question

Transform the homogeneous equation $y' = \frac{-y+t}{4y-t}$ to a separable equation.

Select one:

- ☐ $tv' = \frac{4v^2 + 1}{4v - 1}$
- ☐ $tv' = \frac{-4v^2 - 1}{4v - 1}$
- ☐ $tv' = \frac{4v^2 - 1}{4v - 1}$
- ☐ None of the given answers
- ☐ $tv' = \frac{-4v^2 + 1}{4v - 1}$

Question 10

Not yet answered

Marked out of 2

Flag question

Find a particular solution of the differential equation $y''' - 4y' = t - 4$.

Select one:

- ☐ $y_p = -\frac{1}{8}(t^2 - 4t)$
- ☐ $y_p = -\frac{1}{8}(t^2 - 8t)$
- ☐ $y_p = -\frac{1}{8}(t^2 + 8t)$
- ☐ none of the given answers is true
- ☐ $y_p = -\frac{1}{8}(t^2 + 4t)$

Find the solution of the initial value problem

$$y'' + 10y' + 26y = g(t), y(0) = 0, y'(0) = 0,$$

$$\text{where } g(t) = \begin{cases} -1, & t < 1, \\ 0, & t \geq 1. \end{cases}$$

Select one:

- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where
 $f(t) = \frac{1}{26} - \frac{1}{26}e^{5t} [\cos(t) - 5\sin(t)]$
- ☐ $y(t) = -f(t) + u_2(t)f(t-2)$ where
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- ☐ $y(t) = -f(t) + u_1(t)f(t-1)$ where
 $f(t) = \frac{1}{26} - \frac{1}{26}e^{-5t} [\cos(t) + 5\sin(t)]$
- ☐ none of the given answers is true

Question 8

Not yet answered

Marked out of 2

Flag question

Find a particular solution of the differential equation $y'' - 2y' + 2y = e^t \csc(t)$.

Select one:

- ☒ $y_p = e^t [\cos(t) \ln |\sin(t)| - t \sin(t)]$
- ☐ $y_p = e^t [\sin(t) \ln |\sin(t)| - t \cos(t)]$
- ☐ $y_p = e^t [\cos(t) \ln |\cos(t)| - t \sin(t)]$
- ☐ none of the given answers is true
- ☐ $y_p = e^t [\sin(t) \ln |\cos(t)| - t \cos(t)]$

Question 6

Not yet answered

Marked out of 2

Flag question

Find the solution of the initial value problem

$$x^2 y'' - 3xy' + 4y = -4, \quad y(1) = -5, \quad y'(1) = -4.$$

Select one:

- ☐ none of the given answers is true
- ☐ $y(x) = -1 + 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 - 4x^2 + 4x^2 \ln(x)$
- ☐ $y(x) = -1 - 4x^2 - 4x^2 \ln(x)$
- ☐ $y(x) = -1 + 4x^2 + 4x^2 \ln(x)$

Question 7

Not yet answered

Marked out of 1

Flag question

Find A such that the equation $[x^3 + 12x^2y + xy^2 + y^3] + [Ax^3 + x^2y + 3xy^2 + y^3] \frac{dy}{dx} = 0$ is exact.

Select one:

- ☐ $A = -2$
- ☐ $A = 2$
- ☐ None of the given answers
- ☐ $A = -4$
- ☐ $A = 4$

Question 8

Not yet answered

Marked out of 2

Flag question

Find a particular solution of the differential equation $y'' - 2y' + 2y = e^t \csc(t)$.

Select one:

- ☐ $y_p = e^t [\cos(t) \ln |\sin(t)| - t \sin(t)]$
- ☐ $y_p = e^t [\sin(t) \ln |\sin(t)| - t \cos(t)]$
- ☐ $y_p = e^t [\cos(t) \ln |\cos(t)| - t \sin(t)]$
- ☐ none of the given answers is true
- ☐ $y_p = e^t [\sin(t) \ln |\cos(t)| - t \cos(t)]$

Find $h(y)$ such that $x \sin(y) + ye^x + h(y) = c$ is the solution of the exact equation

$$[\sin(y) + ye^x]dx + [x \cos(y) + e^x - 3 \sin(y)]dy = 0$$

Select one:

- ☐ $h(y) = -3 \sin(y)$
- ☒ $h(y) = 3 \cos(y)$
- ☐ none of the given answers
- ☐ $h(y) = 3 \sin(y)$
- ☐ $h(y) = -3 \cos(y)$