

$$\begin{pmatrix} x(t) \\ y(t) \end{pmatrix} = c_1 \begin{pmatrix} 1 \\ 1 \end{pmatrix} + c_2 \begin{pmatrix} -1 \\ 4 \end{pmatrix} e^{5t}$$

$$\begin{cases} x(t) = c_1 - c_2 e^{5t} \\ y(t) = c_1 + 4c_2 e^{5t} \end{cases}$$

контекст

№1

$$(2x+1)y' + y^2 = x$$

б) - линейное

№1

$$(2x+1)dy + y^2 dx = 0$$

$$\frac{dy}{y^2} + \frac{dx}{2x+1} = 0$$

$$\int \frac{dy}{y^2} + \frac{1}{1} \int \frac{d(2x+1)}{2x+1} = 0$$

$$-\frac{1}{y} + \frac{1}{2} \cdot \ln|2x+1| + C = 0$$

$$y = \frac{2}{\ln|2x+1| + C}$$

Ответ: 2)

1/3

$$y' + 2y = 4$$

$$y(0) = 5$$

$$y = u \cdot v$$

$$y' = u'v + u \cdot v'$$

$$u'v + u(v' + 2v) = 4$$

$$v' + 2v = 0$$

$$\frac{dv}{v} = -2dx$$

$$\ln|v| = -2x$$

$$v = e^{-2x}$$

$$\frac{du}{dx} \cdot e^{-2x} = 4$$

$$du = 4 \cdot e^{2x} dx$$

$$u = 2 \cdot e^{2x} + C$$

$$y = 2 + C e^{-2x}$$

$$y(0) = 5$$

$$5 = 2 + C$$

$$C = 3$$

$$y = 2 + 3e^{-2x}$$

Antwort: 2)

1/4

Antwort: 5)

1/5

Antwort: 2)

1/6

Antwort: 6)



N7

Orbet: 2)

$$x(y^2+1)dx + y(x^2-1)dy = 0$$

N8

Orbet: 2)

$$x(y^2+1)x' = y(1-x^2)$$

$$x' + \frac{y \cdot x}{y^2+1} = \frac{y}{(y^2+1)^2}$$

N9

Orbet: 5)

N10

$$x y' = 1$$

$$y' = \frac{1}{x}$$

$$y = \ln|x| + C \quad - \text{obace pen.}$$

$$y = \ln|x| - \text{calcusea pen}$$

Orbet: 6)

N11

Orbet: a)

N12

Orbet: a), 2)

N13

Orbeti: 5), 6), 9)

N14

$$y'' = (y')^2 + y$$

$$y' = p(y)$$

$$\frac{dp}{dy} = p^2 + y$$

Orbet: a)

$$y'' = (y')^2 + x$$

$$z(x) = y'$$

$$z' = y''$$

$$\frac{dz}{dx} = z^2 + x$$

$$\text{Orbet: 6)}$$

N15

$$y'' - 4y = 0$$

$$k^2 - 4 = 0$$

$$k_1 = 2 \quad k_2 = -2$$

$$y_{\text{gen}} = C_1 e^{2x} + C_2 e^{-2x} \quad \text{Orbet: 6)}$$

N14

$$y'' + 4y = 0$$

$$k_1 = 2i \quad k_2 = -2i$$

$$y_{\text{gen}} = C_1 \cos 2x + C_2 \sin 2x \quad \text{Orbet: 2)}$$

N18

$$y'' - 4y' + 4y = 0$$

$$(k-2)^2 = 0$$

$$k_{1,2} = 2$$

$$y_{\text{gen}} = C_1 e^{2x} + C_2 x e^{2x} \quad \text{Orbet: d)}$$

N19

$$y'' - 4y' = 10$$

$$k^2 - 4k = 0$$

$$k_1 = 2 \quad k_2 = -2$$

$$e^{\pm x} (P_n(x) \cos \beta x + Q_m(x) \sin \beta x)$$

$$\alpha = 0$$

$$\beta = 0$$

$$P_0(x) = 10$$

$$\Rightarrow \tilde{y} = A$$

$$\text{Orbet: 2)}$$

N20

$$y'' + 4y = 10x^2 + 1$$

$$k^2 + 4 = 0$$

$$k_{1,2} = \pm 2i$$

$$\tilde{y} = Ax^2 + Bx + C$$

$$e^{\pm x} (P_n(x) \cos \beta x + Q_m(x) \sin \beta x)$$

$$\alpha = 0$$

$$\beta = 0$$

$$\text{Orbet: 5)}$$



№ 21

$$y'' - 4y = 3 \cos 2x$$

$$k_1 = 2$$

$$k_2 = -2$$

$$e^{\pm \alpha x} (A_n(x) \cos \beta x + Q_m(x) \sin \beta x)$$

$$\bar{y} = A \cos 2x + B \sin 2x$$

$$\frac{\alpha}{\beta} = 0$$

Ответ: 2)

№ 22

$$y'' + p_1 y' + p_2 y = 2x e^x$$

$$k_1 = k_2 = 1$$

$$\bar{y} = x^2 (Ax + B) e^x$$

Ответ: 8)

№ 23

Ответ: а), 2)

№ 24

Ответ: 8), e)

№ 25

$$y'' - 10y' + 26y = 0$$

№ 26

$$y_1 = e^{5x} \sin x$$

$$y_2 = e^{5x} \cos x$$

$$k_{1,2} = 5 \pm i$$

$$y'' - 10y' + 26y = 0$$

$$k^2 - 10k + 26 = 0$$

$$\Delta = 100 - 104 = -4$$

$$k_1 = \frac{10 + 2i}{2} = 5 + i$$

$$k_2 = 5 - i$$

Ответ: 6)

№ 27

Ответ: 5), 2)

To sum up  
 in you let... finish

Interesting  
 u28

$$\begin{cases} y' = y + z \\ z' = 2y - z \end{cases}$$

$$y'' = y' + z'; \quad z' = y'' - y'$$

$$y'' - y' = 2y - (y' - y)$$

$$y'' - 3y = 0$$

Or let: b)

$$y' = \frac{1}{x}$$

$$x(y^2 + 1) + y(x^2 - 1)$$