Multiple Choice
Identify the choice that best completes the statement or answers the question.

__A__ 1. Sa se integreze ecuatia diferentiala liniara cu coeficienti constanti:
$y'' - y = 0$
a. $y^0 = C_1 e^{-x} + C_2 e^x$
b. $y^0 = -C_1 e^{-x} + C_2 e^x$
c. $y^0 = 2C_1 e^{-x} + C_2 e^x$
d. $y^0 = C_1 e^{-x} + 2C_2 e^x$

__A__ 2. Sa se integreze ecuatia diferentiala liniara cu coeficienti constanti:
$y'' - y = 0y'' - y = 0$, y(0)=2, $y'(0) = 0y'(0) = 0$
a. $y^0 = e^{-x} + e^x$
b. $y^0 = 2e^{-x} + e^x$
c. $y^0 = 2e^{-x} - e^x$
d. $y^0 = e^{-x} - 2e^x$

__A__ 3. Sa se integreze ecuatia diferentiala liniara cu coeficienti constanti:
$y'' + 2y' + y = 0$
a. $y^0 = C_1 e^{-x} + C_2 x e^x$
b. $y^0 = C_1 e^{-x} + 2C_2 x e^x$
c. $y^0 = -C_1 e^{-x} + C_2 x e^x$
d. $y^0 = -2C_1 e^{-x} + C_2 x e^x$

__A__ 4. Sa se integreze ecuatia diferentiala liniara cu coeficienti constanti:
$y'' + 2y' + y = 0, y(0) = 0, y'(0) = 1$
a. $y^0 = xe^{-x}$
b. $y^0 = e^{-x} + e^x$
c. $y^0 = xe^x$
d. $y^0 = e^{-x} + 2e^x$

__A__ 5. Sa se integreze ecuatia diferentiala liniara cu coeficienti constanti:
$y^{(4)} - 5y'' + y = 0$
a. $y^0 = C_1 e^{-2x} + C_2 e^{-x} + C_3 e^x + C_4 e^{2x}$
b. $y^0 = C_1 e^{-2x} - C_2 e^{-x} - C_3 e^x + C_4 e^{2x}$
c. $y^0 = -C_1 e^{-2x} + C_2 e^{-x} - C_3 e^x + C_4 e^{2x}$
d. $y^0 = 2C_1 e^{-2x} + C_2 e^{-x} + C_3 e^x + C_4 e^{2x}$

__A__ 6. Sa se integreze ecuatia diferentiala:
$y' + \frac{y}{x} = -xy^2$
a. $y(x^2 + Cx) = 1, C\epsilon\mathbb{R}$
b. $y(x^2 - Cx) = 1, C\epsilon\mathbb{R}$
c. $y(x^2 + Cx) = 1 + x, C\epsilon\mathbb{R}$
d. $y(x^2 + 2Cx) = 1, C\epsilon\mathbb{R}$

__D__ 7. Sa se rezolve problema Cauchy:

$$\begin{cases} \dfrac{dx}{dt} = 8y \\ \dfrac{dy}{dt} = -2z \qquad x(0) = -4, y(0) = 0, z(0) = 1 \\ \dfrac{dz}{dt} = 2x + 8y - 2z \end{cases}$$

a. $\begin{cases} x = 4e^{-2t} + 2\sin 4t \\ y = e^{-2t} - \cos 4t \\ z = e^{-2t} - 2\sin 4t \end{cases}$

b. $\begin{cases} x = -4e^{-2t} - 2\sin 4t \\ y = e^{-2t} - 2\cos 4t \\ z = -e^{-2t} + 2\sin 4t \end{cases}$

c. $\begin{cases} x = -4e^{-2t} - 2\sin 4t \\ y = -2e^{-2t} + 2\cos 4t \\ z = -e^{-2t} + 2\sin 4t \end{cases}$

d. $\begin{cases} x = -4e^{-2t} - 2\sin 4t \\ y = e^{-2t} - \cos 4t \\ z = e^{-2t} - 2\sin 4t \end{cases}$

____ 8. Sa se rezolve ecuatia cu variabile separabile: NU EXISTA EC

a. $y = 2e^{x^2+x+C}, C\epsilon\mathbb{R}$

b. $y = e^{x^2+x+C}, C\epsilon\mathbb{R}$

c. $2y = e^{x^2+x+C}, C\epsilon\mathbb{R}$

d. $y = e^{x^2-x+C}, C\epsilon\mathbb{R}$

D 9. Sa se rezolve ecuatia lui Bernoulli:

$y' - 2ye^x = 2\sqrt{y}\, e^x$

a. $\sqrt{y} - 1 = Ce^x, C\epsilon\mathbb{R}$

b. $\sqrt{y} - 1 = Ce^{e^x}, C\epsilon\mathbb{R}$

c. $\sqrt{y} + 1 = Ce^x, C\epsilon\mathbb{R}$

d. $\sqrt{y} + 1 = Ce^{e^x}, C\epsilon\mathbb{R}$

A 10. Folosind solutia particulara indicata,sa se integreze urmatoarea ecuatie diferentiala:

$y'' + \frac{2}{x}y' + y = 0y'' + \frac{2}{x}y' + y = 0,\ y_1 = \frac{sinx}{x}y_1 = \frac{sinx}{x}$

a. $y = -C_1^2\frac{cosx}{x} - C_2\frac{sinx}{x}$

b. $y = -C_1^2\frac{cosx}{x} + C_2\frac{sinx}{x}$

c. $y = C_1^2\frac{cosx}{x} + C_2\frac{sinx}{x}$

d. $y = -C_1^2\frac{cosx}{x} + C_2\frac{x}{sinx}$

____ 11. Folosind solutia particulara indicata, sa se integreze urmatoarea ecuatie diferentiala:

$xy'' - (x+1)y' - 2(x-1)y = 0xy'' - (x+1)y' - 2(x-1)y = 0,\ y_1 = e^{rx}y_1 = e^{rx}$

a. $y = -\frac{1}{9}C_1(3x+1)e^{-x} + C_2e^{2x}$

b. $y = \frac{1}{9}C_1(3x+1)e^{-x} + C_2e^{2x}$

c. $y = \frac{1}{9}C_1(3x+1)e^{-x} - C_2e^{2x}$

d. $y = -\frac{1}{9}C_1(3x+1)e^{-x} + 2C_2e^{2x}$

C 12. Utilizând schimbarea de functie $y = z^{\frac{1}{2}}$, $z = z(x)$, $y = y(x)$ sa se rezolve ecuatia diferentiala:

$$2x(x - y^2)y^1 + y^3 = 0$$

a. $y = x\ln(Cy), C \in \mathbb{R}$

b. $y^2 = x^2\ln(Cx), C \in \mathbb{R}$

c. $y^2 = x\ln(Cy^2), C \in \mathbb{R}$

d. $y = x^2\ln(Cy), C \in \mathbb{R}$

D 13. Sa se precizeze valoarea parametrului real α astfel încât schimbarea de functie

$$y = z^{\alpha} : y = y(x) \mapsto z = z(x)$$

aduce ecuatia diferentiala:

$$4y^6 + x^3 = 6xy^5y^1$$

la o ecuatie omogena

a. $\alpha = 1$

b. $\alpha = 2$

c. $\alpha = -1$

d. $\alpha = \frac{1}{2}$

A 14. Utilizând schimbarea de functie $y = z^{\frac{1}{2}}$, $y = y(x) \mapsto z = z(x)$, sa se rezolve ecuatia diferentiala

$$4y^6 + x^3 = 6xy^5y^1$$

a. $Cx^4 = y^6 + x^3, C \in \mathbb{R}$

b. $Cx^5 = y^4 + x^3, C \in \mathbb{R}$

c. $Cx^6 = x^4 + y^2, C \in \mathbb{R}$

d. $Cx^3 = y^3 + x^3, C \in \mathbb{R}$

C 15. Sa se integreze sistemul de ecuatii:

$$\frac{dt}{2x} = \frac{dx}{-\ln t} = \frac{dy}{\ln t - 2x}$$

a. $\begin{cases} x = \pm\sqrt{C_1 + t(\ln t + 1)} \\ y = C_2 + t \pm \sqrt{C_1 + t(\ln t + 1)} \end{cases}$

b. $\begin{cases} x = \pm\sqrt{C_1 + t(\ln t + 1)} \\ y = C_2 - t \pm \sqrt{C_1 + t(\ln t + 1)} \end{cases}$

c. $\begin{cases} x = \pm\sqrt{C_1 - t(\ln t - 1)} \\ y = C_2 + t \mp \sqrt{C_1 - t(\ln t - 1)} \end{cases}$

d. $\begin{cases} x = \pm\sqrt{C_1 + t(\ln t - 1)} \\ y = C_2 - t \mp \sqrt{C_1 + t(\ln t - 1)} \end{cases}$

A 16. Sa se integreze sistemul de ecuatii:

$$\frac{dt}{4y - 5x} = \frac{dx}{5t - 3y} = \frac{dy}{3x - 4t}$$

a. $\begin{cases} 3t + 4x + 5y = C_1 \\ t^2 + x^2 + y^2 = C_2 \end{cases}$

b. $\begin{cases} 3t + 4x - 5y = C_1 \\ t^2 - x^2 + y^2 = C_2 \end{cases}$

c. $\begin{cases} 3t - 4x + 5y = C_1 \\ t^2 - x^2 + y^2 = C_2 \end{cases}$

d. $\begin{cases} 3t + 4x - 5y = C_1 \\ t^2 + x^2 + y^2 = C_2 \end{cases}$

D 17. Sa se gaseasca integrala generala a ecuatiei:

$$2x + y = (4x - y)y^1$$

a. $(y+2x)^2 = C(y+x)^2, C\in\mathbb{R}$

b. $(y+2x)^2 = C(y-x)^2, C\in\mathbb{R}$

c. $(y-2x)^2 = C(y+x)^2, C\in\mathbb{R}$

d. $(y-2x)^2 = C(y-x)^2, C\in\mathbb{R}$

A 18. Sa se rezolve ecuatia diferentiala:

$$(8y+10x)dx+(5y+7x)dy=0$$

a. $(y+x)^2(y+2x)^3 = C, C\in\mathbb{R}$

b. $(y-x)^2(y+2x)^3 = C, C\in\mathbb{R}$

c. $(y+x)^2(y-2x)^3 = C, C\in\mathbb{R}$

d. $(y-x)^2(y-2x)^3 = C, C\in\mathbb{R}$

B 19. Sa se gaseasca familia de curbe integrale care satisface ecuatia diferentiala:

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

a. $x+y-1 = Ce^{-2arctg\frac{y+2}{x+y}}, C\in\mathbb{R}$

b. $y+2 = Ce^{-2arctg\frac{y+2}{x-3}}, C\in\mathbb{R}$

c. $x+y-1 = Ce^{2arctg\frac{y+2}{x-3}}, C\in\mathbb{R}$

d. $y+2 = Ce^{2arctg\frac{y+2}{x-3}}, C\in\mathbb{R}$

C 20. Sa se integreze:

$$(3x-7y-3)dy+(7x-3y-7)dx=0$$

a. $(y+x+1)^2(y+x-1)^5 = C, C\in\mathbb{R}$

b. $(y-x-1)^2(y+x+1)^5 = C, C\in\mathbb{R}$

c. $(y-x-1)^2(y+x-1)^5 = C, C\in\mathbb{R}$

d. $(y-x-1)^2(y-x-1)^5 = C, C\in\mathbb{R}$

D 21. Sa se integreze:

$$(4x-5y+11)dx+(-3x+4y-7)dy=0$$

folosind eventual schimbarea de functie şi variabila independenta

$$\begin{cases} u = 4x-5y+11 \\ v = -3v+4y-7 \end{cases}$$

a. $\ln|x-y+4| + \frac{4x-5y+11}{-3x+4y-7} = C, C\in\mathbb{R}$

b. $2\ln|x-y+4| + \frac{-3x+4y-7}{x-y+4} = C, C\in\mathbb{R}$

c. $3\ln|x-2y+4| + \frac{4x-5y+11}{-3x+4y-7} = C, C\in\mathbb{R}$

d. $4\ln|x-y+4| - \frac{4x-5y+11}{x-y+4} = C, C\in\mathbb{R}$

A 22. Sa se afle solutia generala a ecuatiei diferentiale:

$$(x+y)(3dx+dy)=dx-dy$$

a. $3x+y+2\ln|x+y-1| = C, C\in\mathbb{R}$

c. $3x-y-2\ln|x+y-1| = C, C\in\mathbb{R}$

b. $3x - y + 2\ln|x+y-1| = C,\ C\in\mathbb{R}$

d. $3x + y - 2\ln|x+y-1| = C,\ C\in\mathbb{R}$

__B__ 23. Sa se gaseasca solutia generala a ecuatiei diferentiale:

$$x - y^2 + 2xyy^1 = 0$$

folosind schimbarea de functie şi de variabila independenta:

$$\begin{cases} x = u \\ y = v^{\frac{1}{2}} \end{cases}$$

a. $y = x^2\left(C - \ln|x|\right),\ C\in\mathbb{R}$

c. $y = x\left(C - \ln|x|\right),\ C\in\mathbb{R}$

b. $y^2 = x\left(C - \ln|x|\right),\ C\in\mathbb{R}$

d. $y^2 = x^2\left(C - 2\ln|x|\right),\ C\in\mathbb{R}$

__D__ 24. Sa se integreze ecuatia diferentiala:

$$\left(y^4 - 3x^2\right)y^1 + xy = 0$$

folosind schimbarea de functie şi de variabila independenta:

a. $Cy^6 = x^2 + y^4,\ C\in\mathbb{R}$

c. $Cy^6 = x^4 + y^2,\ C\in\mathbb{R}$

b. $Cy^6 = x^4 - y^{42},\ C\in\mathbb{R}$

d. $Cy^6 = x^2 - y^4,\ C\in\mathbb{R}$

__C__ 25. Sa se integreze ecuatia diferentiala:

$$\left(x^2y^2 - 1\right)dy + 2xy^3dx = 0$$

utilizând schimbarea de functie

$$y = \frac{1}{z}\ \therefore\ y = y(x) \mapsto z = z(x)$$

a. $1 + x^2y^2 = Cx,\ C\in\mathbb{R}$

c. $1 + x^2y^2 = Cy,\ C\in\mathbb{R}$

b. $1 - x^2y^2 = \frac{C}{x^2},\ C\in\mathbb{R}$

d. $1 - x^2y^2 = Cx^2,\ C\in\mathbb{R}$

__A__ 26. Sa se determine parametrul real α pentru care schimbarea de functie

$$y = z^\alpha\ \therefore\ y = y(x) \mapsto z = z(x)$$

aduce ecuatia diferentiala

$$2xy^1\left(x - y^2\right) + y^3 = 0$$

la o ecuatie omogena

a. $\alpha = \frac{1}{2}$

c. $\alpha = 1$

b. $\alpha = -\frac{1}{2}$

d. $\alpha = -1$

__A__ 27. Sa se integreze:

$$(x - 2y - 3)dy + (2x + y - 1)dx = 0$$

a. $x^2 + xy - y^2 - x + 3y = C,\ C\in\mathbb{R}$

c. $x^2 + xy + y^2 - x + 3y = C,\ C\in\mathbb{R}$

b. $x^2 - xy + y^2 - x + 3y = C,\ C\in\mathbb{R}$

d. $x^2 - xy + y^2 - x + 3y = C,\ C\in\mathbb{R}$

B 28. Sa se integreze:

$$(x-y+4)dy+(x+y-2)dx=0$$

a. $x^2-2xy+y^2-4x-8y=C,\ C\in\mathbb{R},\ C\in\mathbb{R}$
b. $x^2+2xy-y^2-4x-8y=C,\ C\in\mathbb{R},\ C\in\mathbb{R}$
c. $x^2+2xy-y^2+4x-8y=C,\ C\in\mathbb{R},\ C\in\mathbb{R}$
d. $x^2-2xy-y^2-4x-8y=C,\ C\in\mathbb{R},\ C\in\mathbb{R}$

C 29. Sa se determine curba integrala a ecuatiei:

$$y^1=\frac{x+y-2}{y-x-4}$$

care trece prin punctul $M(1,1)$

a. $x^2+y^2-xy-8x-y=0$
b. $x^3+y^2-xy-4x+6y-1=0$
c. $x^2-y^2+2xy-4x+8y-6=0$
d. $x^2-y^2+xy+8x+y=0$

C 30. Sa se integreze:

$$2x-3y-5-(3x+2y-5)y^1=0$$

a. $y^2+3xy+x^2+5x+5y=C,\ C\in\mathbb{R}$
b. $y^2+3xy+x^2-5x-5y=C,\ C\in\mathbb{R}$
c. $y^2-3xy+x^2+5x-5y=C,\ C\in\mathbb{R}$
d. $y^2-3xy-x^2-5x-5y=C,\ C\in\mathbb{R}$

C 31. Sa se integreze:

$$8x+4y+1+(4x+2y+1)y^1=0$$

a. $(8x+4y+1)^2=4x+C,\ C\in\mathbb{R}$
b. $(4x+2y+1)^2=8x+C,\ C\in\mathbb{R}$
c. $(4x+2y+1)^2=4x+C,\ C\in\mathbb{R}$
d. $(8x+4y+1)^2=8x+C,\ C\in\mathbb{R}$

D 32. Sa se integreze:

$$(x-2y-1)dx+(3x-6y+2)dy=0$$

a. $3x-6y+\ln|x-2y|=C,\ C\in\mathbb{R}$
b. $x-2y+\ln|3x-6y|=C,\ C\in\mathbb{R}$
c. $x-3y+\ln|x-2y|=C,\ C\in\mathbb{R}$
d. $x-3y-\ln|x-2y|=C,\ C\in\mathbb{R}$

A 33. Sa se integreze:

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

a. $(x+y-1)^2+2x=C,\ C\in\mathbb{R}$
b. $(x+y)^2+x=C,\ C\in\mathbb{R}$
c. $(x+y)^2-x=C,\ C\in\mathbb{R}$
d. $(x+y-1)^2-2x=C,\ C\in\mathbb{R}$

B 34. Sa se integreze:

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

a. $x^2-y^2+xy-x+y=C,\ C\in\mathbb{R}$
b. $x^2+y^2+xy+x-y=C,\ C\in\mathbb{R}$
c. $x^2-y^2-xy-x-y=C,\ C\in\mathbb{R}$
d. $x^2-y^2+xy+x-y=C,\ C\in\mathbb{R}$

B 35. Sa se gaseasca integrala generala a ecuatiei:

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

a. $2x+y+5\ln|x+y-3|=C, C\in\mathbb{R}$

b. $x+2y-\ln|x+2y+2|=C, C\in\mathbb{R}$

c. $x+2y+5\ln|x+y-3|=C, C\in\mathbb{R}$

d. $2x+2y-\ln|x+2y+2|=C, C\in\mathbb{R}$

D 36. Sa se gaseasca solutia particulara a ecuatiei diferentiale:

$$(x+y)(2dy+3dx)=dx$$

care satisface conditia initiala

$$y(0)=2$$

a. $3x+2y-4+\ln|x+y+1|=0$

b. $3x-2y+4+2\ln|x+y+1|=0$

c. $3x-2y+4-2\ln|x+y-1|=0$

d. $3x+2y-4+2\ln|x+y-1|=0$

A 37. Determinati solutia problemei Cauchy $\begin{cases} y'\cdot x^3\sin y=2 \\ y\big|_{x\to+\infty}=\dfrac{\pi}{2} \end{cases}$

a. $y=\arccos\dfrac{1}{x^2}$

b. $y=\arccos\dfrac{1}{x}$

c. $y=\dfrac{1}{2}\arccos\dfrac{1}{x}$

d. $y=-2\arcsin\dfrac{1}{x}$

C 38. Sa se rezolve ecuatia diferentiala :

$e^x sin^3 y+(1+e^{2x})\cos y\, y'=0$

a. $arctg\ e^x=arctg\ e^{\sin^2 x}+C,\quad C\in\square;$

b. $arctg\ e^y=\dfrac{1}{\sin^2 x}+C,\quad C\in\square;$

c. $arctg\ e^x=\dfrac{1}{2\sin^2 y}+C,\quad C\in\square;$

d. $x=\dfrac{arctg\ (e^x+C)}{2\sin^2 y},\quad C\in\square.$

D 39. Sa se rezolve problema Cauchy :

$x\sqrt{1-y^2}dx+y\sqrt{1-x^2}dy=0,\quad y\big|_{x=0}=1$

a. $\sqrt{1-x^2}-\sqrt{1-y^2}=1$

b. $\sqrt{1-x^2}+\sqrt{1+y^2}=1$

c. $\sqrt{(1-x^2)^3}-\sqrt{(1-y^2)^3}=1$

d. $\sqrt{1-x^2}+\sqrt{1-y^2}=1$

B 40. Sa se rezolve ecuatia diferentiala :

$y'=ax+by+c,\quad a,b,c-\text{constante}$

a. $ax+by+c=\dfrac{b}{a}C\cdot e^{bx},\quad C\in\square;$

b. b(ax+by+c)+a=C$e^{bx}b^2, C\in\mathbb{R}e^{bx}b^2, C\in\mathbb{R}$

c. $ax+by+c=C\cdot e^{bx},\quad C\in\square;$

d. $\dfrac{ax^2}{2}+\dfrac{by^2}{2}+cxy=C,\quad C\in\square.$

B 41. Sa se rezolve ecuatia cu variabile separabile :

$1+y^2+xyy'=0,\quad y\big|_{x=1}=0$

a. $\sqrt{x}\left(1+y^2\right)=C, \quad C>0$

b. $x^2\left(1+y^2\right)=C, \quad C>0;$

c. $x\left(1+y^2\right)=C, \quad C\in\mathbb{R};$

d. $\dfrac{x}{\sqrt{1+y^2}}=C, \quad C\in\mathbb{R}.$

C 42. Sa se rezolve ecuatia diferentiala :

$$y'=1+\frac{1}{x}-\frac{1}{y^2+2}-\frac{1}{x\left(y^2+2\right)}$$

a. $y-\operatorname{arctg} y=\ln|x|+C, \quad C\in\mathbb{R};$

b. $y+\operatorname{arctg} y=\ln|x|+C, \quad C\in\mathbb{R};$

c. $y+\operatorname{arctg} y=\ln|x|+x+C, \quad C\in\mathbb{R};$

d. $y-\operatorname{arctg} y=\ln|x|-x+C, \quad C\in\mathbb{R}.$

D 43. Sa se rezolve ecuatia diferentiala :

$$\left(x^2+a^2\right)\left(y^2+b^2\right)+\left(x^2-a^2\right)\left(y^2-b^2\right)y'=0$$

a. $\dfrac{x-y}{a}+\ln\left|\dfrac{x-a}{x+a}\right|+\dfrac{2b}{a}\operatorname{arctg}\dfrac{y}{b}=C, \quad C\in\mathbb{R};$

b. $\dfrac{x-y}{a}+\dfrac{1}{b}\operatorname{arctg}\dfrac{y}{b}=\dfrac{1}{2a}\ln\left|\dfrac{x-a}{x+a}\right|+C, \quad C\in\mathbb{R};$

c. $\dfrac{x+y}{a}+\ln\left|\dfrac{x+a}{x-a}\right|=\dfrac{b}{2a}\operatorname{arctg}\dfrac{y}{b}+C, \quad C\in\mathbb{R};$

d. $\dfrac{x+y}{a}+\ln\left|\dfrac{x-a}{x+a}\right|-\dfrac{2b}{a}\operatorname{arctg}\dfrac{y}{b}=C, \quad C\in\mathbb{R}.$

C 44. Folosind eventual schimbarea de functie $y=\dfrac{z(x)}{x}$ sa se transforme si sa se rezolve ecuatia :

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

a. $ye^{\frac{2}{1+xy}}=C, \quad C\in\mathbb{R};$

b. $x^2e^{\frac{2}{1-xy}}=C, \quad C\in\mathbb{R};$

c. $xe^{\frac{2}{1-xy}}=C, \quad C\in\mathbb{R};$

d. $yxe^{\frac{2}{1-xy}}=C, \quad C\in\mathbb{R}.$

D 45. Folosind, eventual, schimbarea $X=x^2, Y=y^2$ Sa se rezolve ecuatia diferentiala :

$$\left(x^2+y^2+a^2\right)xdx+\left(a^2-x^2-y^2\right)ydy=0$$

a. $y^2+x^2=a^2\ln\left(x^2-y^2\right)+C, \quad C\in\mathbb{R};$

b. $y^2-x^2=a^2\ln\left(x^2-y^2\right)+C, \quad C\in\mathbb{R};$

c. $y^2+x^2=a^2\ln\left(x^2+y^2\right)+C, \quad C\in\mathbb{R};$

d. $y^2-x^2=a^2\ln\left(x^2+y^2\right)+C, \quad C\in\mathbb{R};$

A 46. Sa se rezolve ecuatia diferentiala :

$$xy'=\sqrt{x^2-y^2}+y$$

a. $\arcsin\dfrac{y}{x}=\ln Cx, \quad C\in\mathbb{R};$

c. $\sin\dfrac{y}{x}=\arccos\ln(Cx), \quad C\in\mathbb{R};$

b. $arc\cos\frac{x}{y} = \ln x + C, \quad C \in \square;$

d. $\sin\frac{y}{x} = \arcsin(\ln Cx), \quad C \in \square.$

C 47. Sa se rezolve ecuatia diferentiala :

$$xy' = y + x\cos^2\frac{y}{x}$$

a. $ctg\frac{y}{x} = C + x, \quad C \in \square;$

c. $tg\frac{y}{x} = \ln(Cx), \quad C \in \square;$

b. $ctg\frac{y}{x} = \ln\frac{C}{x} \quad C \in \square;$

d. $tg\frac{y}{x} = C, \quad C \in \square.$

D 48. Sa se rezolve ecuatia diferentiala :

$$xy' = y(\ln y - \ln x)$$

a. $y = x(e^x + C), \quad C \in \square;$

c. $y = xe^{Cx}, \quad C \in \square;$

b. $y = x\ln(Cx), \quad C \in \square;$

d. $y = xe^{1+Cx}, \quad C \in \square.$

B 49. Sa se rezolve ecuatiile diferentiale:

$$tgx\sin^2 ydx + \cos^2 xctgydy = 0$$

a. $ctg^2 y = \tan^2 x + C$

c. $arctgy = \arccos x + C$

b. $tg^2 x = ctg^2 y + C$

d. $tg^2\frac{x}{2} = ctg^2\frac{y}{2} + C$

B 50. Sa se rezolve ecuatia cu variabile separabile:

$$xy^1 - y = y^3$$

a. $x = \frac{Cy}{\sqrt{1-y^2}}, C\epsilon\mathbb{R}, C\epsilon\mathbb{R}$

c. $y = \frac{Cx}{\sqrt{1+x^2}}, C\epsilon\mathbb{R}, C\epsilon\mathbb{R}$

b. $x = \frac{Cy}{\sqrt{1+y^2}}, C\epsilon\mathbb{R}$

d. $y = \frac{Cx}{\sqrt{1-x^2}}, C\epsilon\mathbb{R}, C\epsilon\mathbb{R}$

C 51. Sa se integreze:

$$xyy^1 = 1 - x^2$$

a. $x^2 - y^2 = C\ln|x|, C\epsilon\mathbb{R}$

c. $x^2 + y^2 = \ln|Cx^2|, C\epsilon\mathbb{R}$

b. $x^2 - y^2 = x^2\ln|Cx|, C\epsilon\mathbb{R}$

d. $x^2 + y^2 = x^2\ln|Cx|, C\epsilon\mathbb{R}$

A 52. Sa se rezolve ecuatia cu variabile separabile:

$$3e^x tgydx + (1-e^x)\frac{1}{\cos^2 y}dy = 0$$

a. $tgy = C(1-e^x)^3, C\epsilon\mathbb{R}$

c. $tgx = C\ln(1-e^x)^3, C\epsilon\mathbb{R}$

b. $ctgy = C(1+e^x)^3, C\epsilon\mathbb{R}$

d. $tgy = C\ln(1-e^x)^3, C\epsilon\mathbb{R}$

__C__ 53. Sa se gaseasca solutia particulara a ecuatiei diferentiale:

$$\left(1+e^x\right)yy^1=e^x$$

care satisface conditia initiala $y(0)=1$

a. $2e^{-\frac{y^2}{2}}=\sqrt{e}^x\left(1+e^x\right)$

b. $2e^{-\frac{y}{2}}=e\sqrt{1+e^x}$

c. $2e^{\frac{y^2}{2}}=\sqrt{e}\left(1+e^x\right)$

d. $2e^{\frac{y}{2}}=\sqrt{e^x\left(1+e^x\right)}$

__B__ 54. Sa se gaseasca solutia problemei Cauchy:

$$\begin{cases}\left(xy^2+x\right)dx+\left(x^2y-y\right)dy=0\\ y(0)=1\end{cases}$$

a. $1+x^2=\dfrac{2}{1-y^2}$

b. $1-x^2=\dfrac{2}{1+y^2}$

c. $1+y^2=\dfrac{2}{1-x^2}$

d. $1-y^2=\dfrac{2}{1+x^2}$

__D__ 55. Sa se determine curba integrala a ecuatiei diferentiale:

$$y^1\sin x=y\ln y$$

care trece prin punctul $A\left(\dfrac{\pi}{2},1\right)$

a. $y=-1$

b. $y=2$

c. $y=\dfrac{1}{2}$

d. $y=1$

__A__ 56. Utilizând schimbarea de functie $z=x+y,\ y=y(x)\mapsto z=z(x)$ sa se rezolve ecuatia diferentiala:

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

a. $arctg\left(x+y\right)=x+C,\ C\in\mathbb{R}$

b. $arctg\left(x+y\right)=x+C,\ ,C\in\mathbb{R}$

c. $\ln^2\left(x+y\right)=y+C,\ C\in\mathbb{R}$

d. $arctg\left(\dfrac{x}{y}\right)=\ln\left(Cx\right),\ C\in\mathbb{R}$

__D__ 57. Utilizând, eventual, schimbarea de functie $z=2x-y\ \therefore\ y=y(x)\mapsto z=z(x)$, sa se rezolve ecuatia diferentiala:

$$\left(2x-y\right)dx+\left(4x-2y+3\right)dy=0$$

a. $\left(2x-y\right)-2\ln\left|4x-2y+3\right|=C,\ C\in\mathbb{R}$

b. $5x-10y+\ln\left|4x-2y-1\right|=C,\ C\in\mathbb{R}$

c. $2x-y+\ln\left|4x-2y+3\right|=C,\ C\in\mathbb{R}$

d. $5x+10y+C=3\ln\left|10x-5y+6\right|,\ C\in\mathbb{R}$

__A__ 58. Sa se integreze:

$$y^1 = \sqrt{\frac{a^2 - y^2}{a^2 - x^2}}, \quad |x| < a$$

a. $y = a\sin\left(\arcsin\frac{x}{a} + C\right), C \in \mathbb{R}$

b. $y = a\ln\left|x + \sqrt{a^2 - x^2}\right| + C, C \in \mathbb{R}$

c. $y = a\cos\left(\arcsin\frac{x}{a}\right) + C, C \in \mathbb{R}$

d. $y = a\cos\left(\arccos\frac{x}{a}\right) + C, C \in \mathbb{R}$

B 59. Sa se determine solutia problemei Cauchy:

$$\begin{cases} \frac{dx}{x(y-1)} + \frac{dy}{y(x+2)} = 0 \\ y(1) = 1 \end{cases}$$

a. $x + y - \ln\left(\frac{x}{y}\right) = 0$

b. $x + y + 2\ln x - \ln y = 2$

c. $x + y + \ln x - 2\ln y = 2$

d. $x - y + \ln\left(\frac{x}{y}\right) = 0$

C 60. Sa se determine curba integrala a ecuatiei diferentiale:

$$x\left(y^6 + 1\right)dx + y^2\left(x^4 + 1\right)dy = 0$$

care satisface conditia initiala: $y(0) = 1$

a. $3arctgx^2 - 2arctgy^3 = \frac{\pi}{2}$

b. $2arctgx^3 - 3arctgy^2 = \frac{\pi}{2}$

c. $3arctgx^2 + 2arctgy^3 = \frac{\pi}{2}$

d. $2arctgx^3 + 3arctgy^2 = \frac{\pi}{2}$

D 61. Sa se rezolve ecuatia diferentiala:

$$\left(\sqrt{xy} - \sqrt{x}\right)dx + \left(\sqrt{xy} + \sqrt{y}\right)dy = 0$$

a. $x + y + 2\sqrt{x} + 2\sqrt{y} + 2\ln\left|\left(\sqrt{x} + 1\right)\left(\sqrt{y} - 1\right)\right| = C, C \in \mathbb{R}$

b. $x - y + 2\sqrt{x} - 2\sqrt{y} + 2\ln\left|\left(\sqrt{x} + 1\right)\left(\sqrt{y} - 1\right)\right| = C, C \in \mathbb{R}$

c. $x - y - 2\sqrt{x} - 2\sqrt{y} - 2\ln\left|\left(\sqrt{x} + 1\right)\left(\sqrt{y} - 1\right)\right| = C, C \in \mathbb{R}$

d. $x + y - 2\sqrt{x} + 2\sqrt{y} + 2\ln\left(\sqrt{x} + 1\right) + 2\ln\left|\sqrt{y - 1}\right| = C, C \in \mathbb{R}$

A 62. Sa se rezolve ecuatia diferentiala:

$$5e^x tgy dx + \left(1 - e^x\right)\frac{dy}{\cos^2 y} = 0$$

a. $tgy = C\left(1 - e^x\right)^5, C \in \mathbb{R}$

b. $tgx = C\left(1 + e^y\right)^5, C \in \mathbb{R}$

c. $ctgy = C\left(1 - e^x\right)^5, C \in \mathbb{R}$

d. $tgy = C\left(1 + e^x\right)^5, C \in \mathbb{R}$

C 63. Rezolvati problema Cauchy:

$$\begin{cases}(1+e^{2x})y^2dy = e^x dx \\ y(0) = 0\end{cases}$$

a. $\frac{1}{2}y^2 + \frac{\pi}{4} = arcctge^x$

b. $\frac{1}{3}y^3 - \frac{\pi}{4} = arctge^x$

c. $\frac{1}{3}y^3 + \frac{\pi}{4} = arctge^x$

d. $\frac{1}{3}y^3 + arctge^x = \frac{\pi}{4}$

D 64. Sa se rezolve problema Cauchy:

$$\begin{cases}y^1 = \frac{y}{\ln y} \\ y(2) = 1\end{cases}$$

a. $2(y-2) = \ln^2 x$

b. $2(x+2) = \ln^2 y$

c. $2(y+2) = \ln^2 x$

d. $2(x-2) = \ln^2 y$

A 65. Sa se rezolve ecuatia lui Bernoulli:

$y^1 - xy = -xy^3$

a. $(1+Ce^{-x^2})y^2 = 1, C\epsilon\mathbb{R}$

b. $(1+Ce^{x^2})y^2 = 1, C\epsilon\mathbb{R}$

c. $(1+Ce^{-x^2})y = 1, C\epsilon\mathbb{R}$

d. $(1+Ce^{x^2})y = 1, C\epsilon\mathbb{R}$

B 66. Sa se rezolve ecuatia lui Bernoulli:

$xy^1 + y = y^2 \ln x$

a. $y = 1 + Cx + \ln x, C\epsilon\mathbb{R}$

b. $y = \frac{1}{1+Cx+\ln x}, C\epsilon\mathbb{R}$

c. $y^2 = 1 + Cx + \ln x, C\epsilon\mathbb{R}$

d. $y = (1+Cx+\ln x)^2, C\epsilon\mathbb{R}$

D 67. Sa se rezolve ecuatia lui Bernoulli:

$3xy^2y^1 - 2y^3 = x^3$

a. $y = x^3 + Cx^2, C\epsilon\mathbb{R}$

b. $y^3 = x^3 + Cx, C\epsilon\mathbb{R}$

c. $y^2 = x^2 + Cx^3, C\epsilon\mathbb{R}$

d. $y^3 = x^3 + Cx^2, C\epsilon\mathbb{R}$

A 68. Sa se rezolve ecuatia lui Bernoulli:

$y^1 + 2xy = y^2 e^{x^2}$

a. $y = \frac{e^{-x^2}}{C-x}, C\epsilon\mathbb{R}$

b. $y = \frac{e^{-x^2}}{C+x}, C\epsilon\mathbb{R}$

c. $y = \frac{Ce^{-x}}{1-x}, C\epsilon\mathbb{R}$

d. $y = \frac{C}{1+x}e^{-x^2}, C\epsilon\mathbb{R}$

A 69. Sa se rezolve ecuatia lui Bernoulli:

$$2y^1 \ln x + \frac{y}{x} = y^{-1} \cos x$$

a. $y^2 \ln x = C + \sin x,\ C \in \mathbb{R},\ C \in \mathbb{R}$

b. $y \ln^2 x = C - \sin x,\ C \in \mathbb{R},\ C \in \mathbb{R}$

c. $y \ln x = C + \cos x,\ C \in \mathbb{R},\ C \in \mathbb{R}$

d. $y \ln^2 x = C + \sin x,\ C \in \mathbb{R},\ C \in \mathbb{R}$

B 70. Sa se rezolve ecuatia lui Bernoulli:

$$2y^1 \sin x + y \cos x = y^3 \sin^2 x$$

a. $y^2 (C + x) \sin x = 1,\ C \in \mathbb{R}$

b. $y^2 (C - x) \sin x = 1,\ C \in \mathbb{R}$

c. $y^2 (C - x) \cos x = 1,\ C \in \mathbb{R}$

d. $y^2 (C + x) \cos x = 1,\ C \in \mathbb{R}$

D 71. Sa se integreze ecuatia lui Bernoulli:

$$y^1 - y \cos x = y^2 \cos x$$

a. $y = \dfrac{1}{Ce^{\sin x} - 1},\ C \in \mathbb{R}$

b. $y = \dfrac{1}{Ce^{\cos x} - 1},\ C \in \mathbb{R}$

c. $y = \dfrac{1}{Ce^{-\cos x} - 1},\ C \in \mathbb{R}$

d. $y = \dfrac{1}{Ce^{-\sin x} - 1},\ C \in \mathbb{R}$

A 72. Sa se integreze ecuatia lui Bernoulli:

$$y^1 + 2xy = 2xy^2$$

a. $y = \dfrac{1}{1 + Ce^{x^2}},\ C \in \mathbb{R}$

b. $y = \dfrac{1}{1 + Ce^{-x^2}},\ C \in \mathbb{R}$

c. $y = \dfrac{1}{1 - Ce^{x^2}},\ C \in \mathbb{R}$

d. $y = \dfrac{1}{1 - Ce^{-x^2}},\ C \in \mathbb{R}$

B 73. Sa se rezolve ecuatia integrala:

$$x \int_0^x y(t)\,dt = (x+1) \int_0^x t y(t)\,dt,\ x > 0$$

a. $y = Cx^3 e^{-\frac{1}{x}},\ C \in \mathbb{R}$

b. $y = Cx^{-3} e^{\frac{1}{x}},\ C \in \mathbb{R}$

c. $y = Cx^{-3} e^{-\frac{1}{x}},\ C \in \mathbb{R}$

d. $y = Cx^3 e^{\frac{1}{x}},\ C \in \mathbb{R}$

D 74. Integrati ecuatia lui Bernoulli:

$$y^1 + \frac{y}{x} = x^2 y^4$$

a. $y = x \sqrt[3]{3 \ln \left(\frac{C}{x} \right)},\ C \in \mathbb{R}$

b. $y = x^2 \sqrt[3]{3 \ln \left(\frac{C}{x} \right)},\ C \in \mathbb{R}$

c. $y = x \sqrt[3]{3 \ln \frac{C}{x}},\ C \in \mathbb{R}$

d. $y = x \left(3 \ln \left(\frac{C}{x} \right) \right)^{-\frac{1}{3}},\ C \in \mathbb{R}$

B 75. Rezolvati problema Cauchy $\begin{cases} y' = \frac{y}{x} + \left(\frac{y}{x}\right)^2 \\ y(2) = 1 \end{cases}$ $\begin{cases} y' = \frac{y}{x} + \left(\frac{y}{x}\right)^2 \\ y(2) = 1 \end{cases}$

a. $y = \dfrac{x}{2+\ln 2-\ln x}$

b. $y = \dfrac{-x}{2+\ln 2-\ln x}$

c. $y = \dfrac{x}{2+\ln 2+\ln x}$

d. $y = \dfrac{x}{2+\ln 2+\ln x}$

C 76. Sa se integreze ecuatia neliniara:

$$y^1 - tgy = e^x \frac{1}{\cos y}$$

reducând-o la o ecuatie de tip Bernoulli sau una liniara cu ajutorul schimbarii de functie: $z=\sin y \therefore z(x)=\sin y(x)$

a. $\sin y=(C-x)e^x, C\in\mathbb{R}$

b. $\cos y=(C-x)e^x, C\in\mathbb{R}$

c. $\sin y=(x+C)e^x, C\in\mathbb{R}$

d. $\cos y=(x+C)e^x, C\in\mathbb{R}$

D 77. Sa se reduca ecuatia neliniara:

$$y^1 = y\left(e^x + 1\ln y\right)$$

la o ecuatie de tip Bernoulli sau una liniara cu ajutorul schimbarii de functie: $z=\ln y \therefore z(x)=\ln y(x)$

a. $\ln y=(C-x)e^x, C\in\mathbb{R}$

b. $\ln x=(C-y)e^y, C\in\mathbb{R}$

c. $\ln x=(y+C)e^y, C\in\mathbb{R}$

d. $\ln y=(x+C)e^x, C\in\mathbb{R}$

B 78. Sa se reduca ecuatia neliniara:

$$y^1\cos y+\sin y = x+1$$

la o ecuatie de tip Bernoulli sau una liniara cu ajutorul schimbarii de functie: $z=\sin y \therefore z(x)=\sin y(x)$

a. $\sin y=(x+C)e^x, C\in\mathbb{R}$

b. $\sin y=(x+C)e^{-x}, C\in\mathbb{R}$

c. $\cos y=(x+C)e^x, C\in\mathbb{R}$

d. $\cos y=(-x+C)e^{-x}, C\in\mathbb{R}$

B 79. Sa se rezolve ecuatia neliniara:

$$yy^1+1=(x-1)e^{-\frac{y^2}{2}}$$

reducând-o la o ecuatie de tip Bernoulli sau una liniara cu ajutorul schimbarii de functie: $z=e^{\frac{y^2}{2}} \therefore z(x)=e^{\frac{y^2(x)}{2}}$

a. $x+2+Ce^{-x}=e^{-\frac{y^2}{2}}, C\in\mathbb{R}$

b. $x-2+Ce^{-x}=e^{\frac{y^2}{2}}, C\in\mathbb{R}$

c. $x-2+Ce^{-x}=e^{-\frac{y^2}{2}}, C\in\mathbb{R}$

d. $x+2+Ce^{x}=e^{\frac{y^2}{2}}, C\in\mathbb{R}$

D 80. Saa se rezolve ecuatia diferentiala:

$xy' - y = y^3$

a. $Cx^2 = \frac{y}{\sqrt{y^2+1}}, C \epsilon \mathbb{R}$

b. $Cx = \frac{-y}{\sqrt{y^2+1}}, C \epsilon \mathbb{R}$

c. $Cx = \frac{y+1}{\sqrt{(^2+1}}, C \epsilon \mathbb{R}$

d. $Cx = \frac{y}{\sqrt{y^2+1}}, C \epsilon \mathbb{R}$

A 81. Sa se reduca ecuatia integrala:

$$y(x) = \int_0^x y(t)\,dt + e^x$$

la o ecuatie Bernoulli şi apoi sa se rezolve.

a. $y = (x+1)e^x$

b. $y = (x-1)e^x$

c. $y = (x+1)e^{Cx}$

d. $y = (x-1)e^{-Cx}$

C 82. Utilizând schimbarea de functie necunoscuta $y = y(x) \mapsto x = x(y)$ sa se rezolve ecuatia diferentiala $(x^2 \ln y - x)y^1 = y$

a. $y = \frac{1}{\ln x - 1 + Cx}, C \epsilon \mathbb{R}$

b. $y = \frac{1}{\ln x + 1 - Cy}, C \epsilon \mathbb{R}$

c. $y = \frac{1}{\ln y - 1 - Cx}, C \epsilon \mathbb{R}$

d. $y = \frac{1}{\ln y + 1 - Cy}, C \epsilon \mathbb{R}$

B 83. Sa se rezolve ecuatia lui Bernoulli:

$$y' = \frac{y}{x-1} + \frac{y^2}{x-1}$$

a. $y = \frac{x+1}{C-x}, C \epsilon \mathbb{R}$

b. $y = \frac{x-1}{C-x}, C \epsilon \mathbb{R}$

c. $y = \frac{x}{C-x}, C \epsilon \mathbb{R}$

d. $y = -\frac{x}{C+x}, C \epsilon \mathbb{R}$

C 84. Sa se rezolve ecuatia lui Bernoulli:

$$y' + \frac{2}{x}y = \frac{2}{\cos^2 x}\sqrt{y}$$

a.

a. $\sqrt{y} + tgx = \frac{\ln \sin x + C}{x}, C \epsilon \mathbb{R}$

b. $\sqrt{y} + tgx = \frac{\ln \cos x + C}{x}, C \epsilon \mathbb{R}$

c. $\sqrt{y} = tgx + \frac{\ln \cos x + C}{x}, C \epsilon \mathbb{R}$

d. $\sqrt{y} = tgx + \frac{\ln \sin x + C}{x}, C \epsilon \mathbb{R}$

A 85. Sa se rezolve ecuatia:

$y'tgx = y$

a. $y = Csinx, C\epsilon\mathbb{R}$

b. $y = C + sinx, C\epsilon\mathbb{R}$

c. $y = Ccosx, C\epsilon\mathbb{R}$

$d.\ y = C(sinx + cosx), C \cdot \mathbb{R}$

A 86. Sa se rezolve ecuatia lui Bernoulli:

$$4xy' + 3y = -e^x x^4 y^5$$

a. $y^{-4} = x^3(x+C), C\epsilon\mathbb{R}$

b. $y^{-2} = x^3(x+C), C\epsilon\mathbb{R}$

c. $y^{-4} = x^3(C-x), C\epsilon\mathbb{R}$

d. $y^{-2} = x^3(C-x), C\epsilon\mathbb{R}$

B 87. Sa se rezolve ecuatia lui Bernoulli:

$$\begin{cases} y' + \dfrac{3x^2}{x^3+1}y = (x^3+1)\sin x y^2 \\ y(0) = 1 \end{cases}$$

a. $y = \dfrac{1}{(x^3+1)\sin x}$

b. $y = \dfrac{1}{(x^3+1)\cos x}$

c. $y = \dfrac{\sin x}{(x^3+1)}$

d. $y = \dfrac{\cos x}{(x^3+1)}$

C 88. Sa se rezolve ecuatia lui Bernoulli:

$$y' - 2ytgx + y^2\sin^2 x = 0$$

considerând x ca functie necunoscuta.

a. $y = \dfrac{1}{(ctgx - x + C)\cos^2 x}, C\epsilon\mathbb{R}$

b. $y = \dfrac{1}{(tgx + x + C)\cos^2 x}, C\epsilon\mathbb{R}$

c. $y = \dfrac{1}{(tgx - x + C)\cos^2 x}, C\epsilon\mathbb{R}$

d. $y = \dfrac{1}{(ctgx + x + C)\cos^2 x}, C\epsilon\mathbb{R}$

A 89. Sa se rezolve ecuatia diferentiala liniara:

$$y^2 + 2xy = 2xe^{-x^2}$$

a. $y = (x^2 + C)e^{-x^2}, C\epsilon\mathbb{R}$

b. $y = (C - x^2)e^{-x^2}, C\epsilon\mathbb{R}$

c. $y = Ce^{-x^2}, C\epsilon\mathbb{R}$

d. $y = xCe^{-x^2}, C\epsilon\mathbb{R}$

A 90. Sa se rezolve ecuatia diferentiala:

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

a. $y = xln\frac{c}{x}, C\epsilon\mathbb{R}$

b. $y = 2xln\frac{c}{x}, C\epsilon\mathbb{R}$

c. $y = -xln\frac{c}{x}, C\epsilon\mathbb{R}$

d. $y = xln\frac{x}{c}, C\epsilon\mathbb{R}$

C 91. Utilizând, eventual, schimbarea de functie $y = uv \therefore u = u(x), v = v(x)$, sa se determine solutia particulara a problemei:

$$\begin{cases} x(x-1)y^1 + y = x^2(2x-1) \\ y(2) = 4 \end{cases}$$

a. $y = -x^2$
b. $y = \dfrac{x^2}{2}$
c. $y = x^2$
d. $y = 2x^2$

D 92. Sa se rezolve ecuatia liniara:

$$y^1 + 2y = e^{-x}$$

a. $y = Ce^{2x} + e^{x}, C \in \mathbb{R}$
b. $y = Ce^{2x} + e^{-x}, C \in \mathbb{R}$
c. $y = Ce^{-2x} + e^{x}, C \in \mathbb{R}$
d. $y = Ce^{-2x} + e^{-x}, C \in \mathbb{R}$

A 93. Sa se integreze ecuatia:

$$(x - y)ydx - x^2dy = 0$$

a. $x = Ce^{\frac{x}{y}}, C \in \mathbb{R}$
b. $x = 2Ce^{\frac{x}{y}}, C \in \mathbb{R}$
c. $y = Ce^{\frac{x}{y}}, C \in \mathbb{R}$
d. $y = C + e^{\frac{x}{y}}, C \in \mathbb{R}$

B 94. Sa se integreze ecuatia liniara:

$$y^1 - 2xy = 2xe^{-x^2}$$

a. $y = (C + x)e^{-x^2}, C \in \mathbb{R}$
b. $y = (C + x^2)e^{x^2}, C \in \mathbb{R}$
c. $y = (C - x^2)e^{x^2}, C \in \mathbb{R}$
d. $y = (C - x)e^{x^2}, C \in \mathbb{R}$

C 95. Sa se integreze ecuatia liniara:

$$y^1 + 2xy = e^{-x^2}$$

a. $y = (C - x)e^{-x^2}, C \in \mathbb{R}$
b. $y = (C + x)e^{x^2}, C \in \mathbb{R}$
c. $y = (C + x)e^{-x^2}, C \in \mathbb{R}$
d. $y = (C - x)e^{x^2}, C \in \mathbb{R}$

D 96. Sa se determine solutia problemei Cauchy:

$$\begin{cases} y^1 \cos x - y \sin x = 2x \\ y(0) = 0 \end{cases}$$

a. $y = \dfrac{x}{\sin x}$
b. $y = \dfrac{x}{\cos^2 x}$
c. $y = \dfrac{x}{\sin^2 x}$
d. $y = \dfrac{x^2}{\cos x}$

A 97. Sa se determine curba integrala a ecuatiei diferentiale:

$$y^1 - ytgx = \frac{1}{\cos^3 x}$$

care trece prin originea axelor de coordonate

a. $y = \frac{\sin x}{\cos^2 x}$

b. $y = \frac{\cos x}{\sin^2 x}$

c. $y = \frac{\cos^2 x}{\sin x}$

d. $y = \frac{\sin^2 x}{\cos x}$

__B__ 98. Sa se integreze:

$xy^1 - 2y = x^3 \cos x$

a. $y = Cx^2 - x^2 \sin x, C\epsilon\mathbb{R}$

b. $y = Cx^2 + x^2 \sin x, C\epsilon\mathbb{R}$

c. $y = Cx^2 - x^2 \cos x, C\epsilon\mathbb{R}$

d. $y = Cx^2 + x^2 \cos x, C\epsilon\mathbb{R}$

__C__ 99. Sa se rezolve ecuatia diferentiala liniara:

$y^1 x \ln x - y = 3x^3 \ln^2 x$

a. $y = (C + x^2)\ln x, C\epsilon\mathbb{R}$

b. $y = (C - x^3)\ln x, C\epsilon\mathbb{R}$

c. $y = (C + x^3)\ln x, C\epsilon\mathbb{R}$

d. $y = (C - x^2)\ln x, C\epsilon\mathbb{R}$

__A__ 100. Sa se rezolve ecuatia diferentiala:

$y' = -\frac{x+y}{x}$

a. $y = \frac{C}{x} - \frac{x}{2}, C\epsilon\mathbb{R}$

b. $y = \frac{C}{x} + \frac{x}{2}, C\epsilon\mathbb{R}$

c. $y = \frac{C}{2x} - \frac{x}{2}, C\epsilon\mathbb{R}$

d. $y = \frac{C}{x} - \frac{x}{3}, C\epsilon\mathbb{R}$

__A__ 101. Sa se determine solutia particulara a ecuatiei liniare:

$y^1 + y\cos x = \cos x$

care satisface conditia initiala

$y|_{x=0} = 1$

a. $y = 1$

b. $y = -x$

c. $y = 2x$

d. $y = -\frac{x^2}{2}$

__A__ 102. Sa se rezolve ecuatia diferentiala:

$y' = \frac{4}{x}y + x\sqrt{y}$

a. $y = x^4(\frac{1}{2}\ln x + C)^2, C\epsilon\mathbb{R}$

b. $y = x^4(\frac{1}{2}\ln x - C)^2, C\epsilon\mathbb{R}$

c. $y = 2x^4(\frac{1}{2}\ln x + C)^2, C\epsilon\mathbb{R}$

d. $y = 2x^4(\frac{1}{2}\ln x - C)^2, C\epsilon\mathbb{R}$

__A__ 103. Sa se rezolve ecuatia diferentiala:

$(1 + e^x)yy' = e^x$

a. $\frac{y^2}{2} = \ln(1 + e^x) + C, C\epsilon\mathbb{R}$

b. $\frac{y^2}{2} = \ln(1 + 2e^x) + C, C\epsilon\mathbb{R}$

c. $\frac{y^2}{2} = \ln(1 - e^x) + C, C\epsilon\mathbb{R}$

d. $\frac{3y^2}{2} = \ln(1 + e^x) + C, C\epsilon\mathbb{R}$

____ 104. Sa se integreze ecuatia liniara: **B SI D SUNT IDENTICE**

$$y^1 - ye^x = 2xe^{e^x}$$

a. $y = (C - x^2)e^{e^x}, C\epsilon\mathbb{R}$

b. $y = (C + x^2)e^{e^x}, C\epsilon\mathbb{R}$

c. $y = (C - x)e^{e^x}, C\epsilon\mathbb{R}$

d. $y = (C + x^2)e^{e^x}, C\epsilon\mathbb{R}$

__A__ 105. Sa se integreze ecuatia liniara:

$$y^1 + xe^x y = e^{(1-x)e^x}$$

a. $y = (C + x)e^{(1-x)e^x}, C\epsilon\mathbb{R}$

b. $y = (C - x)e^{(1-x)e^x}, C\epsilon\mathbb{R}$

c. $y = (C + x^2)e^{(1-x)e^x}, C\epsilon\mathbb{R}$

d. $y = (C - x^2)e^{(1-x)e^x}, C\epsilon\mathbb{R}$

__A__ 106. Sa se rezolve problema Cauchy:

$$(1 + e^x)yy' = e^x(1 + e^x)yy' = e^x, y(0) = 1\ y(0) = 1$$

a. $\frac{y^2-1}{2} = \ln(1 + e^x)$

b. $\frac{y^2+1}{2} = \ln(1 + e^x)$

c. $\frac{y^2-1}{2} = \ln(1 - e^x)$

d. $\frac{y^2+1}{2} = \ln(1 - e^x)$

__C__ 107. Sa se determine solutia particulara a ecuatiei $y^1 \sin x + y\cos x = 1$ care satisface conditia:

$$y \to 0 \to 0 \text{ pentru } x \to \frac{\pi}{2}$$

a. $y = \frac{x}{tgx}$

b. $y = \frac{x}{arctgx}$

c. $y = \frac{1}{sinx}(x + \frac{\pi}{2})$

d. $y = xtgx$

__A__ 108. Sa se rezolve problema Cauchy:

$$(1 + y^2) + xyy' = 0, y(1) = 0$$

a. $x\sqrt{1 + y^2} = 1$

b. $x\sqrt{1 - y^2} = 1$

c. $y\sqrt{1 + y^2} = 1$

d. $y\sqrt{1 + x^2} = 1$

__A__ 109. Sa se rezolve problema la limita:

$$\begin{cases} 2xy^1 - y = 1 - \dfrac{2}{\sqrt{x}} \\ y \to -1 \text{ pentru } x \to +\infty \end{cases}$$

a. $y = \dfrac{1}{\sqrt{x}} - 1$

b. $y = \dfrac{2}{\sqrt{x}}$

c. $y = \dfrac{1}{\sqrt{x}} + 1$

d. $y = 1 - \dfrac{1}{\sqrt{x}}$

A 110. Sa se integreze:

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

a. $y = \dfrac{C}{x-2},\ x \neq 2, C \in \mathbb{R}$

b. $y = \ln|x-2| + C, C \in \mathbb{R}$

c. $y = \ln\left(\dfrac{C}{x-2}\right), C \in \mathbb{R}$

d. $y = \dfrac{1}{2}\ln|C(x-2)|, C \in \mathbb{R}$

B 111. Sa se integreze:

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

a. $y = C(x+2), C \in \mathbb{R}$

b. $y = C(x-2), C \in \mathbb{R}$

c. $y = \dfrac{C}{x+2}, C \in \mathbb{R}$

d. $y = C(2x+1), C \in \mathbb{R}$

C 112. Sa se rezolve ecuatia liniara :

$$3y^1(x^2-1) - 2xy = 0$$

a. $y^3 = C(x^2+1), C \in \mathbb{R}$

b. $y^3 = \dfrac{C}{x^2+1}, C \in \mathbb{R}$

c. $y^3 = C(x^2-1), C \in \mathbb{R}$

d. $y^3 = \dfrac{C}{x^2-1}, C \in \mathbb{R}$

D 113. Sa se determine solutia problemei Cauchy:

$$\begin{cases} (1+x^2)y^1 + y\left(\sqrt{1+x^2} - x\right) = 0 \\ y|_{x=0} = 1 \end{cases}$$

a. $y = \dfrac{\sqrt{1+x^2}}{x - \sqrt{1+x^2}}$

b. $y = \dfrac{\sqrt{1-x^2}}{\sqrt{1+x^2} - x}$

c. $y = \dfrac{\sqrt{1-x^2}}{\sqrt{1-x^2} + x}$

d. $y = \dfrac{\sqrt{1+x^2}}{x + \sqrt{1+x^2}}$

A 114. Sa se integreze eciatia diferentiala reductibila la o ecuatie omogena:

$$(3x + 3y - 1)dx + (x + y + 1)dy = 0$$

a. $3x+y+\ln(x+y-1)^2=C, C\epsilon\mathbb{R}$
b. $3x+y+\ln(x+y+1)^2=C, C\epsilon\mathbb{R}$
c. $3x-y+\ln(x+y-1)^2=C, C\epsilon\mathbb{R}$
d. $3x-y+\ln(x-y-1)^2=C, C\epsilon\mathbb{R}$

B 115. Sa se rezolve problema Cauchy:

$$\begin{cases} y'=(2x+1)ctgx \\ y|_{x=\frac{\pi}{2}}=\frac{1}{2} \end{cases} \begin{cases} y'=(2x+1)ctgx \\ y|_{x=\frac{\pi}{2}}=\frac{1}{2} \end{cases}$$

a. $y=2\sin^2 x+1$
b. $y=2\sin^2 x-1$
c. $y=2\cos^2 x-1$
d. $y=2\cos^2 x+1$

A 116. Sa se integreze ecuatia:
$xy'-y+x=0$
a. $y=(C-ln|x|), C\epsilon\mathbb{R}$
b. $y=(C+ln|x|), C\epsilon\mathbb{R}$
c. $y=(C-2ln|x|), C\epsilon\mathbb{R}$
d. $y=(C+2ln|x|), C\epsilon\mathbb{R}$

D 117. Sa se determine solutia $y(x)$ a ecuatiei integrale:

$$x\int_0^x y(t)dt=(x+1)\int_0^x ty(t)dt$$

a. $yx^3=Ce^{-x}, C\epsilon\mathbb{R}$
b. $yx^3=Ce^{x}, C\epsilon\mathbb{R}$
c. $yx^3=Ce^{\frac{1}{x}}, C\epsilon\mathbb{R}$
d. $yx^3=Ce^{-\frac{1}{x}}, C\epsilon\mathbb{R}$

A 118. Sa se rezolve problema Cauchy:
$y'+2xy=x^3, y(0)=\dfrac{e-1}{2}$
a. $y=\dfrac{(e^{1-x^2}+x^2-1)}{2}$
b. $y=\dfrac{(e^{1-x^2}+x^2+1)}{2}$
c. $y=\dfrac{(e^{1-x^2}+x^2-2)}{2}$
d. $y=\dfrac{(e^{1-x^2}-x^2-1)}{2}$

B 119. Sa se integreze:
$xy^1-y+x=0$
a. $y=Cx+x\ln|x|, C\epsilon\mathbb{R}$
b. $y=Cx-x\ln|x|, C\epsilon\mathbb{R}$
c. $y=x\ln(|x|+C), C\epsilon\mathbb{R}$
d. $y=x\ln|C-x|, C\epsilon\mathbb{R}$

C 120. Sa se rezolve ecuatia liniara:
$y^1-y=-x^2$
a. $y=(x-1)^2+Ce^x, C\epsilon\mathbb{R}$
b. $y=(x+2)^2-Ce^x, C\epsilon\mathbb{R}$
c. $y=(x+1)^2+1+Ce^x, C\epsilon\mathbb{R}$
d. $y=(x+1)^2+Ce^x, C\epsilon\mathbb{R}$

D 121. Sa se rezolve problema Cauchy:

$$\begin{cases} y^1 + 2xy = x^3 \\ y\big|_{x=0} = \dfrac{e-1}{2} \end{cases}$$

a. $y = \frac{1}{2}\left(e^{1-x^2} - x^2 + 1\right)$

b. $y = \frac{1}{2}\left(e^{x^2-1} - x^2 + 1\right)$

c. $y = \frac{1}{2}\left(e^{1-x^2} - x^2 - 1\right)$

d. $y = \dfrac{x^2 - 1 + e^{1-x^2}}{2}$

B 122. Sa se rezolve ecuatia liniara:

$y^1 + ay = be^{rx},\ r \neq -a$

a. $y = \dfrac{bx}{a+r}e^{-rx} + Ce^{-rx}, C\epsilon\mathbb{R}$

b. $y = \dfrac{be^{rx}}{a+r} + Ce^{-rx}, C\epsilon\mathbb{R}$

c. $y = \dfrac{be^{-rx}}{a+r} + Ce^{-rx}, C\epsilon\mathbb{R}$

d. $y = \dfrac{bx}{a+r}e^{rx} + Ce^{-rx}, C\epsilon\mathbb{R}$

D 123. Sa se rezolve ecuatia liniara:

$xy^1 - y + \ln x = 0$

a. $y = 1 - \ln x + Cx,\ x \geq 0, C\epsilon\mathbb{R}$

b. $y = \ln|x| + Cx - 1, C\epsilon\mathbb{R}$

c. $y = 1 - \ln x + Cx,\ x > 0, C\epsilon\mathbb{R}$

d. $y = 1 + \ln x + Cx, C\epsilon\mathbb{R}$

C 124. Determinati solutia problemei Cauchy:

$$\begin{cases} y^1 + y\cos x = \sin x \cos x \\ y(0) = 1 \end{cases}$$

a. $y = \sin x + 1 + 2e^{\sin x}$

b. $y = \cos x - 1 - 2e^{\cos x}$

c. $y = \sin x - 1 + 2e^{-\sin x}$

d. $y = \cos x + 1 + 2e^{\cos x}$

A 125. Sa se gaseasca solutia particulara a ecuatiei:

$y^1 \cos^2 x + y = tgx$

care satisface conditia initiala

$y\big|_{x=0} = 0$

a. $y = tgx - 1 + e^{-tgx}$

b. $y = tgx + 1 + e^{tgx}$

c. $y = tgx - 1 - e^{-tgx}$

d. $y = tgx - 1 - e^{tgx}$

B 126. Sa se integreze ecuatia liniara:

$$y^1 + \frac{xy}{1-x^2} = \arcsin x + x$$

a. $y = \sqrt{1+x^2}\left(\frac{1}{2}\arcsin^2 x - \sqrt{1+x^2} + C\right), C\epsilon\mathbb{R}$

b. $y=\sqrt{1-x^2}\left(\frac{1}{2}\arcsin^2 x-\sqrt{1-x^2}+C\right), C\epsilon\mathbb{R}$

c. $y=\sqrt{1-x^2}\left(\frac{1}{2}\arcsin^2 x+\sqrt{1-x^2}+C\right), C\epsilon\mathbb{R}$

d. $y=\sqrt{1+x^2}\left(\frac{1}{2}\arcsin^2 x+\sqrt{1+x^2}+C\right), C\epsilon\mathbb{R}$

__B__ 127. Sa se rezolve ecuatia diferentiala omogena:

$xy^1=\sqrt{x^2-y^2}+y$

a. $, y=x\sin(\ln Cx)\ \ C\epsilon\mathbb{R}$

b. $arcsin\frac{y}{x}=x+c, arcsin\frac{y}{x}=x+c, C\epsilon\mathbb{R}$

c. $arctg\frac{y}{x}=\ln(Cx), C\epsilon\mathbb{R}$

d. $\frac{1}{y}\arccos\frac{y}{x}=\ln(Cx), C\epsilon\mathbb{R}$

__B__ 128. Sa se rezolve ecuatia diferentiala omogena:

$xy'=y+xcos^2\frac{y}{x}xy'=y+xcos^2\frac{y}{x}$

a. $arctg\left(\ln\frac{y}{x}\right)=\ln(Cx), C\epsilon\mathbb{R}$

b. $tg\frac{y}{x}=\ln(Cx), C\epsilon\mathbb{R}$

c. $arctg(xy)=\ln\frac{C}{x}, C\epsilon\mathbb{R}$

d. $tg\frac{x}{y}=\ln(Cy), C\epsilon\mathbb{R}$

__C__ 129. Sa se rezolve ecuatia diferentiala:

$(x-y)dx+xdy=0$

a. $\frac{y}{x}=\ln(Cx), C\epsilon\mathbb{R}$

b. $\frac{y-x}{x}=\ln(Cx), C\epsilon\mathbb{R}$

c. $y=x(C-\ln x),\ C\epsilon\mathbb{R}$

d. $\frac{y^2}{2}=\frac{x^2}{2}+C,\ C\epsilon\mathbb{R}$

__A__ 130. Sa se integreze:

$xy^1=y+\sqrt{y^2-x^2}$

a. $y=\sqrt{y^2-x^2=Cx^2}, C\epsilon\mathbb{R}$

b. $y-\sqrt{x^2+y^2}=Cx, C\epsilon\mathbb{R}$

c. $y^2+\sqrt{x^2-y^2}=Cx^2, C\epsilon\mathbb{R}$

d. $x^2-xy+y^2=C, C\epsilon\mathbb{R}$

__B__ 131. Sa se integreze:

$(y-x)dx+(x+y)dy=0$

a. $y^2+2xy+x^2=C, C\epsilon\mathbb{R}$

b. $y^2+2xy-x^2=C, C\epsilon\mathbb{R}$

c. $x^2-y^2-\frac{xy}{2}=C, C\epsilon\mathbb{R}$

d. $x^2y^2-x^2-y^2=C,\ C\epsilon\mathbb{R}$

C 132. Sa se integreze ecuatia omogena:

$$2x^2y^1 = x^2 + y^2$$

a. $y = x\ln(Cx),\ C\epsilon\mathbb{R}$

b. $y^2 = x^2\ln(Cx),\ C\epsilon\mathbb{R}$

c. $2x = (x-y)\ln(Cx), C\epsilon\mathbb{R}$

d. $x = y\ln(Cx),\ C\epsilon\mathbb{R}$

D 133. Sa se rezolve ecuatia diferentiala omogena:

$$(4x-3y)dx+(2y-3x)dy = 0$$

a. $x^2 - 3xy + 2y^2 = C,\ C\epsilon\mathbb{R}$

b. $y^2 + 3xy - 2x^2 = C,\ C\epsilon\mathbb{R}$

c. $y^2 - 3xy + 2x^2 = Cx^2,\ C\epsilon\mathbb{R}$

d. $y^2 - 3xy + 2x^2 = C,\ C\epsilon\mathbb{R}$

A 134. Sa se integreze ecuatia diferentiala:

$$xy^1 = y(\ln y - \ln x)$$

a. $y = xe^{1+Cx},\ C\epsilon\mathbb{R}$

b. $y = xe^{Cx},\ C\epsilon\mathbb{R}$

c. $y = x\ln(Cx),\ C\epsilon\mathbb{R}$

d. $\frac{y}{x} = Ce^x,\ C\epsilon\mathbb{R}$

True/False

Indicate whether the statement is true or false.

F 135. O ecuatie de tip Bernoulli se poate reduce prin substitutia $z = y^{1-\alpha}$ la o ecuatie liniara.

T 136. O ecuatie de tip Bernoulli are forma generala:

$$y' + P(x)y = Q(x)y^{\alpha}, \alpha\epsilon\mathbb{R}\setminus\{0,1\}$$

T 137. In cazul ecuatiilor de tip Bernoulli se face substitutia : $z = y^{1-\alpha}, \alpha\epsilon\mathbb{R}\setminus\{0,1\}$

T 138. Solutia generala a unei ecuatii liniare este de forma:

$$y = e^{-\int P(x)dx}\left[C + \int Q(x)e^{\int P(x)dx}dx\right]$$

T 139. Solutia generala a ecuatiei $y' = f(x)\,g(y)$ este:

$$?\int \frac{dy}{g(y)} = \int f(x)dx + C$$

T 140. Cu substitutia y=xu(x), o ecuatie diferentiala de ordin întâi omogena se poate reduce la o ecuatie cu variabile separabile.

F 141. Cu substitutia y=xu(x), o ecuatie diferentiala de ordin întâi omogena se poate reduce la o ecuatie de tip Bernoulli.

F 142. Cu substitutia y=xu(x), o ecuatie diferentiala de ordin întâi omogena se poate reduce la o ecuatie liniara.

F 143. Solutia generala a unei ecuatii liniare este de forma:

$$y = e^{\int P(x)dx}\left[C + \int Q(x)e^{-\int P(x)dx}dx\right]$$

F 144. In cazul ecuatiilor de tip Bernoulli se face substitutia : $z = y^{\alpha}, \alpha \epsilon \mathbb{R} \setminus \{0,1\}$

F 145. O ecuatie liniara are forma generala
$y' + P(x)y = Q(x)y^{\alpha}, \alpha \epsilon \mathbb{R} \setminus \{0,1\}$

F 146. O ecuatie de tip Bernoulli are forma generala:
$y' + P(x)y = Q(x)$

F 147. O ecuatie de forma y'=f$\left(\frac{ax+by+c}{mx+ny+p}\right)$ cu a,b,c,m,n,p$\epsilon\mathbb{R}$ se poate reduce la o ecuatie liniara.

T 148. O ecuatie de forma y'=f$\left(\frac{ax+by+c}{mx+ny+p}\right)$ cu a,b,c,m,n,p$\epsilon\mathbb{R}$ se poate reduce la o ecuatie omogena.

T 149. O ecuatie liniara are forma generala
$y' + P(x)y = Q(x)$

T 150. Ecuatiile diferentiale de forma F(y, y',…,$y^{(n)}) = 0$ se integreaza notând
$y' = p \text{ și luând } p \text{ drept variabila independenta}$.

T 151. O ecuatie de tip Euler se reduce la o ecuatie cu coeficienti constanti prin schimbarea de variabila |x|=e^t

F 152. O ecuatie de tip Bernoulli are forma generala:

$$y' + P(y)y = Q(x)y^{\alpha}, \alpha \epsilon \mathbb{R} \setminus \{0,1\}$$

F 153. O ecuatie de tip Bernoulli are forma generala:

$$y' + P(x)y = Q(y)y^{\alpha}, \alpha \epsilon \mathbb{R} \setminus \{0,1\}$$

F 154. O ecuatie liniara are forma generala

$y' + P(y)y = Q(x)$

__F__ 155. In cazul ecuatiilor de tip Bernoulli se face substitutia: y=xu(x)

__T__ 156. In cazul ecuatiilor diferentiale de ordin intai omogene se face substitutia $z = y^{\alpha}$

__F__ 157. In cazul ecuatiilor diferentiale de ordin intai omogene se face substitutia $y' = p$

__F__ 158. In cazul ecuatiilor diferentiale de ordin intai omogene se face substitutia $|x|=e^{t}$

__F__ 159. Cu substitutia y=xu(x), o ecuatie cu variabile separabile se poate reduce la o ecuatie omogena.

__T__ 160. Solutia singulara a unei ecuatii diferentiale se regaseste in solutia generala.

__T__ 161. Solutia generala a unei ecuatii diferentiale de ordin intai este formata dintr-o familie de curbe.

__F__ 162. Solutia generala a unei ecuatii diferentiale de ordin intai este formata dintr-o familie de suprafete.

__T__ 163. Solutia generala a ecuatiei $y' = \frac{f(x)}{g(y)}$ este:

$\int g(y)dy = \int f(x)dx + C$