Differensial tenglamalar

№1.
Qiyinlik darajasi-1

Differensial tenglama deb nimaga aytiladi?
Erkli o‘zgaruvchi va no’malum funksiya va uning hosilalari yoki differensiallarini bog‘lovchi munosabatlar differensial tenglama deyiladi
Erkli o‘zgaruvchi va no’malum funksiya bog‘lovchi munosabatlar differensial tenglama deyiladi
Noma’lum funksiyani bog‘lovchi munosabat differensial tenglama deyiladi
Erkli o‘zgaruvchi va no’malum funksiya hosilalari yoki differensiallarini bog‘lovchi munosabatlar differensial tenglama deyiladi

№2. Qiyinlik darajasi-1

Oddiy differensial tenglama deb nimaga aytiladi?
Agar no’malum funksiya bitta erkli o‘zgaruvchiga bog‘liq bo‘lsa, bunday differensial tenglama oddiy differensial tenglama deyiladi
Agar no’malum funksiya ikkita erkli o‘zgaruvchiga bog‘liq bo‘lsa, bunday differensial tenglama oddiy differensial tenglama deyiladi
Agar no’malum funksiya uchta erkli erkli o‘zgaruvchiga bog‘liq bo‘lsa, bunday differensial tenglama oddiy differensial tenglama deyiladi
Agar no’malum funksiya beshta erkli erkli o‘zgaruvchiga bog‘liq bo‘lsa, bunday differensial tenglama oddiy differensial tenglama deyiladi

№3.
Qiyinlik darajasi-1

Differensial tenglama erkli o‘zgaruvchiga nechta erkli o‘zgaruvchiga bog‘liq bo‘lsa, xususiy hosila differensial tenglama deyiladi?
2 yoki undan ortiq
3 yoki undan ortiq
1 yoki undan ortiq
4 yoki undan ortiq

№4.
Qiyinlik darajasi-1

Differensial tenglamaga kirgan hosilalarning eng yuqori tartibi nima deb ataladi?
Differensial tenglama tartibi
Differensial tenglama o‘lchami
Differensial tenglama o‘lchovi
Differensial tenglama yechimi

№5.
Qiyinlik darajasi-1

Differensial tenglamaning yechimi eki integrali deb tenglamaga qo‘yganda uni ayniyatga aylantiradigan nimaga aytiladi?
Har qanday differensiallanuvchi funksiyaga aytiladi
Har qanday uzilishga ega bo‘lgan funksiyaga aytiladi

Har qanday funksionalga aytiladi
Har qanday uzluksiz funksiyaga aytiladi

№6.
Qiyinlik darajasi-1

quyidagi tenglama nechanchi tartibli differensial tenglama $y''-y'\cos x - x^2 y = 0$
2-tartibli
1-tartibli
3-tartibli
4-tartibli

№7.
Qiyinlik darajasi-1

Quyidagi differensial tenglamaning tartibini aniqlang: $x(1-y^2)dx - y(1-x^2)dy = 0$
1-tartibli
3-tartibli
5-tartibli
0-tartibli

№8.
Qiyinlik darajasi-1

quyidagi differensial tenglamada erkli o‘zgaruvchi nechta: $x\frac{\partial z}{\partial x} = y\frac{\partial z}{\partial y}$
2 ta
5 ta
3 ta
1 ta

№9.
Qiyinlik darajasi-2

$y = e^{Cx}$ chiziqlar oilasining differensial tenglamasini toping:
$y = e^{\frac{xy'}{y}}$
$y'' = 0$
$y'' + y = 0$
$y' = \cos x$

№10.
Qiyinlik darajasi-2

$y = \sin(x + C)$ chiziqlar oilasining differensial tenglamasini toping:
$y^2 + y'^2 = 1$
$y' = y$
$y' = y^2$
$y' = \cos x(x + C)$

№11.

Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $xydx+(x+1)dy=0$
$y=c(x+1)e^{-x}$
$y=cx+1$
$y=ce^{x}$
$y'=cxe^{x}$

№12.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $2x^2yy'+y^2=2$
$y=\sqrt{2-ce^{\frac{1}{x}}}$
$y=ce^{x}$
$y=2-ce^{x}$
$y=ce^{\frac{1}{x}}$

№13.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $xy'+y=y^2$
$y=cxy+1$
$y=cx-2$
$y=cy-x$
$y=c(x-y)$

№14.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $x\dfrac{dx}{dt}+t=1$
$x^2+t^2-2t=c$
$x=2ct+1$
$x=ct^2-t$
$x^2=ct-1$

№15.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $y'-y=2x-3$
$y+2x-1=ce^{x}$
$y=cx+x^2$
$y=x+ce^{x}$
$y=c(x-1)e^{x}$

№16.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $(x^2-1)y'+2xy^2=0$

$y(\ln\|x^2-1\|+c)=1,\ y=0$
$y=c\ln(x+1)$
$y=ce^x+1$
$y'=\cos x(x+C)$

№17.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $y'-xy^2=2xy$
$\left\|\frac{y}{y+2}\right\|=ce^{x^2}$
$y=cxy+2$
$y=cx^2-2$
$y=\sin(x+C)$

№18.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $y'=3\sqrt[3]{y^2}$
$y=(x+c)^3, y=0$
$y=cx^2-3x$
$cx=y^2$
$y=\cos(2x+C)$

№19.
Qiyinlik darajasi-2

Quyidagi differensial tenglamani yeching: $(x+2y)y'=1$
$x+2y+2=ce^y$
$y=(2x-c)^2$
$y=ce^x+1$
$y=\cos Cx)$

№20.
Qiyinlik darajasi-1

Birinchi tartibli oddiy differensial tenglamani umumiy ko‘rinishini aniqlang
$F(x,y,y')=0$
$F(x,y,c,)=0$
$\Phi(y,y')=0$
$y'=f(x,y)$

№21.
Qiyinlik darajasi-2

Birinchi tartibli differensial tenglamaga qo‘yilgan Koshi masalasini aniqlang:
$\begin{cases} y'=f(x,y) \\ y\big\|_{x=x_0}=y_0 \end{cases}$

$\begin{cases} y' = f(x,y) \\ x\vert_{x=x_0} = y_0 \end{cases}$
$\begin{cases} y' = f(x,y) \\ y'\vert_{x=x_0} = y_0 \end{cases}$
$\begin{cases} y' = f(x,y) \\ y''\vert_{x=x_0} = y_0' \end{cases}$

№22.
Qiyinlik darajasi-2

Birinchi tartibli oddiy differensial tenglama umumiy yechimi ko‘rinishini aniqlang:
$\Phi(x,y,c)=0$
$F(x,y,y')=0$
$y' = f(y,c)$
$y' = f(x,c)$

№23.
Qiyinlik darajasi-2

O‘zgaruvchilarga ajralgan oddiy differensial tenglamani aniqlang
$M_1(x)dx + N_1(x)dy = 0$
$M_1(x)dx +$ $+ N_1(x,y)dy = 0$
$M(x,y)dx + N(x,y)dy = 0$
$M_1(x,y)dx + N_1(x)dy = 0$

№24.
Qiyinlik darajasi-2

O‘zgaruvchilarga ajraladigan oddiy differensial tenglamani aniqlang
$M_1(x)N_1(y)dx +$ $+ M_2(x)N_2(y)dy = 0$
$M(x,y)dx +$ $+ N(x,y)dy = 0$
$M_1(y)dx +$ $+ N_1(x,y)dy = 0$
$M_1(x)dx +$ $+ N_1(x,y)dy = 0$

№25.
Qiyinlik darajasi-3

Quyidagi differensial tenglama umumiy yechimini toping: $x(1+y^3)dx - y^2(1+x^2)dy = 0$
$(1+x^2)^3 = e^c(1+y^3)^2$
$(1+x^3)^3 = \ln c(1+y^2)^2$
$(1+x^2)^3 = (1+y^3)^2$

$(1+x^2)^3 = c(1+y^3)^2$

№26.
Qiyinlik darajasi-2

Birinchi tartibli chiziqli oddiy differensial tenglamani ko‘rinishini toping
$y'+P(x)y=Q(x)$
$y'=f(x,y)$
$y'+P(x)z=Q(x)$
$M(x,y)dx+N(x,y)dy=0$

№27.
Qiyinlik darajasi-2

Quyidagifunksiyanibirjinsliliko‘lchovinianiqlang: $f(x)=\sqrt{x^2+y^2}$
1-o‘lchovli
2-o‘lchovli
3-o‘lchovli
4-o‘lchovli

№28.
Qiyinlik darajasi-2

Quyidagi funksiyaning bir jinslilik o‘lchovini aniqlang: $f(x,y)=\dfrac{x-xy}{x+y^2}$
o‘lchovi yo‘q
2-o‘lchovli
1-o‘lchovli
0-o‘lchovli

№29.
Qiyinlik darajasi-3

$f(x,y)$ 0 o‘lchovli 1 jinsli funksiyani ko‘rinishini aniqlang:
$f(x,y)=\varphi\left(\dfrac{y}{x}\right)$
$f(x,y)=\varphi(x+y)$
$f(x,y)=\varphi(xy)$
$f(x,y)=\varphi\left(\dfrac{1}{xy}\right)$

№30 .
Qiyinlik darajasi-2

Birinchi tartibli bir jinsli differensial tenglamani yechishda qanday almashtirish bajariladi?
$z=\dfrac{y}{x}$
$z=xy$
$z=x-y$
$z=x+y$

№31.

Qiyinlik darajasi-3

$\frac{dy}{dx}=f\left(\frac{ax+by+c}{a_1x+b_1y+c_1}\right)$ tenglamada $\Delta=\begin{vmatrix} a & b \\ a_1 & b_1 \end{vmatrix}\neq 0$ bo‘lsa, qanday almashtirish bajariladi
$x=\alpha+u,\ y=\beta+v$
$x=\frac{\alpha}{u},\ y=\frac{\beta}{v}$
$x=\alpha u,\ y=\beta v$
$x=zy$

№32.
Qiyinlik darajasi-3

$\frac{dy}{dx}=f\left(\frac{ax+by+c}{a_1x+b_1y+c_1}\right)$ tenglamada $\Delta=\begin{vmatrix} a & b \\ a_1 & b_1 \end{vmatrix}=0$ bo‘lsa, qanday almashtirish bajariladi
$z=ax+by$
$z=ax$
$z=by$
$z=ax+c$

№33.
Qiyinlik darajasi-2

Birinchi tartibli chiziqli tenglamani yechish usuli nomini aniqlang
Ixtiyoriy o‘zgarmasni variatsiyalash usuli
Aniqmas koeffitsientlar usuli
Ketma-ket yaqinlashish usuli
Ketma-ket yo‘qotish usuli

№34.
Qiyinlik darajasi-2

O‘rniga qo‘yish usulida qanday almashtirish bajariladi?
$y=uv$
$y=u^2v$
$y=uv^2$
$y=u+v$

№35.
Qiyinlik darajasi-3

Umumlashgan bir jinsli tenglamada qanday almashtirish bajarilishini aniqlang
$y=z^{\alpha}$
$y=z+x$
$y=\frac{u}{v}$
$y=uv$

№36.
Qiyinlik darajasi-3

Quyidagi tenglamaning umumiy yechimini toping: $y'=\frac{y+\sqrt{x^2-y^2}}{x}$

$y = x\sin(\ln cx)$
$y = x\ln(\sin cx)$
$y = x\ln(\cos cx)$
$y = xtg(\ln cx)$

№37.
Qiyinlik darajasi-3

Tenglamaning umumiy yechimini aniqlang: $y' + \frac{1}{x}y = \frac{\sin x}{x}$
$y = \frac{1}{x}(c - \cos x)$
$y = \frac{1}{x}(c - \sin x)$
$y = \frac{1}{x}(c - \cos\sin x)$
$y = \frac{1}{x}(c - \arccos x)$

№38.
Qiyinlik darajasi-2

Quyidagi tenglamalarni qaysi biri Bernulli tenglamasi hisoblanadi:
$y' + P(x)y = Q(x)y^{\alpha}$
$y' + P(x)y + Q(x)y^2 = F(x)$
$y' + Q(x)y^2 = F(x)$
$y' + Q(x)y^2 = F(x)y^{\alpha}$

№39.
Qiyinlik darajasi-3

Bernulli tenglamasi qanday tenglamaga keltiriladi?
Chiziqli
Bir jinsli
Eyler
Rikkati

№40.
Qiyinlik darajasi-2

Rikkati tenglamasini aniqlang
$y' + P(x)y + Q(x)y^2 = F(x)$
$y' + Q(x)y^4 = F(x)$
$x^2 y' + P(x)y^{\frac{1}{2}} = 0$
$y' + P(x)y^3 = Q(x)$

№41.
Qiyinlik darajasi-2

Rikkati tenglamasi avval qanday tenlamaga keltiriladi?
Bernulli
Lagranj

O‘zgaruvchilarga ajralgan
Klero

№42.
Qiyinlik darajasi-3

Rikkati tenglamasining yechishda qanday almashtirish bajariladi
$y = y_1(x) + z$
$y = uv$
$y = \frac{u}{v}$
$y = y_1(x)z$

№43.
Qiyinlik darajasi-3

Differensial tenglama to‘liq bo‘lishining zaruriy va yetarli shartini aniqlang: $(M(x,y)dx + N(x,y)dy = 0)$
$\frac{\partial N}{\partial x} = \frac{\partial M}{\partial y}$
$\frac{\partial M}{\partial x} = \frac{\partial N}{\partial x}$
$\frac{\partial^2 M}{\partial x^2} = \frac{\partial^2 N}{\partial y^2}$
$\frac{\partial^2 M}{\partial x \partial y} = \frac{\partial^2 N}{\partial x \partial y}$

№44.
Qiyinlik darajasi-3

Quyidagi Koshi masalasini yeching: $\begin{cases} 2x\cos^2 y dx + (2y - x^2 \sin 2y)dy = 0 \\ y\|_{x=0} = 0 \end{cases}$
$x^2 \cos^2 y + y^2 = 0$
$x^2 tg^2 y + y^2 = 0$
$y^2 \cos^2 y + x^2 = 0$
$x^2 \sin^2 y + y^2 = 0$

№45.
Qiyinlik darajasi-3

Quyidagi tenglama uchun integralovchi ko‘paytuvchi qanday bo‘ladi: $(x^2 - y)dx + (x^2 y^2 + x)dy = 0$
$\mu(x) = \frac{1}{x^2}$
$\mu(x) = x^2$
$\mu(x) = \frac{1}{x^3}$
$\mu(x) = x^3$

№46.

Qiyinlik darajasi-3

Koshi masalasini yechimining mavjudlik shartini aniqlang: $\begin{cases} y' = f(x,y) \\ y\|_{x=x_0} = y_0 \end{cases}$
$f(x,y)-$uzluksiz
$\frac{\partial^2 f}{\partial y^2}-$ mavjud va uzluksiz
$f(x,y)-$2-tartibli hosilasi mavjud
$\frac{\partial f}{\partial y}-$ mavjud va uzluksiz

№47.
Qiyinlik darajasi-3

Koshi masalasini yechimining yagonalik shartini aniqlang: $\begin{cases} y' = f(x,y) \\ y\|_{x=x_0} = y_0 \end{cases}$
$\frac{\partial f}{\partial y}-$ mavjud va uzluksiz
$f(x,y)-$2-tartibli hosilasi mavjud
$\frac{\partial^2 f}{\partial y^2}-$mavjud va uzluksiz
$f(x,y)-$uzluksiz

№48.
Qiyinlik darajasi-2

$y' = \frac{y}{x}$ tenglamani $(0,0)$ maxsus nuqtasini nomini aniqlang
dikritik tugun
Egar
Tugun
Fokus

№49.
Qiyinlik darajasi-2

$y' = \frac{2y}{x}$ tenglamani $(0,0)$ maxsus nuqtasini nomini aniqlang
Tugun
Fokus
dikritik nuqta
Markaz

№ 50.
Qiyinlik darajasi-2

$y' = -\frac{y}{x}$ tenglamani $(0,0)$ maxsus nuqtasini nomini aniqlang
Egar
Fokus
Markaz

Tugun

№51.
Qiyinlik darajasi-3

$y'=\frac{x+y}{x-y}$ tenglamani $(0,0)$ maxsus nuqtasini nomini aniqlang
Fokus
Egar
Dikritik tugun
Markaz

№52.
Qiyinlik darajasi-2

$y'=-\frac{x}{y}$ tenglamani $(0,0)$ maxsus nuqtasini nomini aniqlang
Markaz
Fokus
Dikritik tugun
Egar

№53.
Qiyinlik darajasi-2

Differensial tenglamada uning umumiy yechimidan ixtiyoriy o‘zgarmasning hech bir qiymatida hosil qilish mumkin bo‘lmagan yechim nima deb ataladi
maxsus yechim
xususiy yechim
umumiy yechim
maxsus nuqta

№54.
Qiyinlik darajasi-3

Maxsus yechimni topish formulasini toping
$\begin{cases}\Phi(x,y,c)=0\\ \Phi_c(x,y,c)=0\end{cases}$
$\begin{cases}\Phi(x,y,y',c)=0\\ \Phi_c(x,y,y',c)=0\end{cases}$
$\begin{cases}\Phi(x,y)=0\\ \Phi_c(x,y)=0\end{cases}$
$\begin{cases}\Phi(x,y',c)=0\\ \Phi_c(x,y',c)=0\end{cases}$

№ 55.
Qiyinlik darajasi-2

Klero tenglamasini aniqlang
$y=xy'+\psi(y')$

$y = xy^2 + \psi(y')$
$y = x + \psi(y')$
$y = x(y')^{-1} + \psi(y')$

№ 56.
Qiyinlik darajasi-3

Klero tenglamasini umumiy yechimi ko‘rinishini aniqlang
$y = cx + \psi(c)$
$y = x + \psi(c)$
$y = x(c)^{-1} + \psi(c)$
$y = c^2 x + \psi(c)$

№ 57.
Qiyinlik darajasi-3

Klero tenglamasini maxsus yechimini aniqlang
$y = xp_0(x) + \psi(p_0(x))$
$x = y\varphi(y') + \psi(y')$
$x' = y\varphi(y) + \psi(y)$
$y = x'\varphi(y) + \psi(y')$

№ 58.
Qiyinlik darajasi-3

Lagranj tenglamasining ko‘rinishini aniqlang
$x = y\varphi(y') + \psi(y')$
$y = x\varphi(y') + \psi(y')$
$x' = y\varphi(y) + \psi(y)$
$y = y'\varphi(x) + \psi(x)$

№ 59.
Qiyinlik darajasi-3

Lagranj tenglamasining maxsus yechimi ko‘rinishini aniqlang
$y = x\varphi(p_0) + \psi(p_0)$
$y' = x\varphi(p_0) + \psi(p_0)$
$y = y'\varphi(p_0) + \psi(p_0)$
$x = y'\varphi(p_0) + \psi(p_0)$

№ 60.
Qiyinlik darajasi-3

Quyidagi tenglamaning maxsus yechimini toping: $y = x + y'^3$
$y = x + 1$
$y = x + 3$
$y = x + 2$
$y = x + 4$

№ 61.
Qiyinlik darajasi-1

Birinchi tartibli chiziqli tenglamada $Q(x)$ qanday bo‘lsa, chiziqli bir jinsli tenglama deyiladi?
$Q(x)=0$
$Q(x)\neq 0$
$Q(x)=1$
$Q(x)=x$

№ 62.
Qiyinlik darajasi-3

Ushbu $y=Cx^3$ chiziqlar oilasi qaysi diffirensial tenglamaning yechimi?
$*xy'=3y$
$y=e^{xy^{1/y}}$
$y'=3y^{2/3}$
$y=xy'$

№ 63.
Qiyinlik darajasi-3

$y'=ax^{\alpha}+by^{\beta}$ tenglama α va β ning qanday qiymatlarida $y=z^m$ almashtirish yordamida bir jinsli tenglamaga keltiriladi
$\frac{1}{\beta}-\frac{1}{\alpha}=1$
$\alpha+\beta=1$
$-\frac{1}{\alpha}-\frac{1}{\beta}=1$
$\alpha-\beta=1$

№ 64.
Qiyinlik darajasi-3

Agary1 vay2 – birinchitartiblichiziqlitenglamaningikkitaturliyechimlaribo‘lsa, tenglamaningumumiyyechimiy1 vay2 yordamidaqandayyoziladi?
$y=y_1+c(y_2-y_1)$
$y=y_1\cdot y_2$
$y=\frac{y_1}{y_2}$
Yozib bo‘lmaydi

№ 65.
Qiyinlik darajasi-2

Quyidagi funksiyalardan qaysi $y^2dx-(xy+x^3)dy=0$ tenglama uchun integrallovchi ko‘paytuvchi bo‘ladi?

$\frac{1}{x^3}$
$\frac{1}{y}$
$\frac{1}{x^2}$
$\frac{1}{y^2}$

№ 66.
Qiyinlik darajasi-2

Quyidagi funksiyalardan qaysi $y(x+y)dx+(xy+1)dy=0$ tenglama uchun integrallovchi ko‘paytuvchi bo‘ladi?
$\frac{1}{y}$
$\frac{1}{x^2}$
$\frac{1}{x^3}$
$\frac{1}{y^2}$

№ 67.
Qiyinlik darajasi-3

$e^{-x}\frac{1}{y}$ funksiya quyidagi tenglamalardan qaysi biri uchun integrallovchi ko‘paytuvchi bo‘ladi?
$y^2dx+\left(e^x-y\right)dy=0$
$e^{-x}xydx-\left(x^2+y^2\right)dy=0$
$e^{-x}dx-$ $-\left(2y+xe^{-x}\right)dy=0$
Hamma javoblar noto‘g‘ri

№ 68.
Qiyinlik darajasi-3

Agar $M(x,y)dx+N(x,y)dy=0$ tenglamada $M(x,y)$ va $N(x,y)$ m-tartibli bir jinsli funksiyalar bo‘lsa, u holda integrallovchi ko‘paytuvchi qanaqa ko‘rinishda bo‘ladi?
$m(x,y)=\left[xM+yN\right]^{-1}$
$m(x,y)=xM+yN$
$m(x,y)=\frac{x+y}{M+N}$
$m(x,y)=\left[xN+yM\right]^{-1}$

№ 69.
Qiyinlik darajasi-3

Shunday egri chiziqlarni topingki, uning har bir nuqtasiga o‘tkazilgan urinma koordinata o‘qlari bilan birgalikda yuzasi $2a^2$ ga teng bo‘lgan uchburchak hosil qilsin
$xy = \pm a^2$
$y = \frac{1}{a^2}$
$xy = \pm 2a^2$
$y = a^4$

№ 70.
Qiyinlik darajasi-3

Differensial tenglamalar tuzish yo‘li bilan $y = cx^2$ chiziqlar oilasiga ortogonal chiziqlar oilasini toping
$2y^2 + x^2 = c$
$y = cx^{-2}$
$y = -cx^2$
$y^2 + 2x = c$

№71.
Qiyinlik darajasi-2

Quyidagi tenglamalardan qaysi biri bir jinsli tenglama emas?
$(x^2 + y)dx - xdy = 0$
$xy' Cos \frac{y}{x} = yCos \frac{y}{x} - x$
$(2x^3 - xy^2)dx + ...$ $+ (2y^3 - x^2 y)dy = 0$
$y' = \frac{y^3}{2(xy^2 - x^3)}$

№72.
Qiyinlik darajasi-2

$y' + P(x)y = Q(x)$ tenglamani integrallovchi ko‘paytuvchi qanaqa ko‘rinishda bo‘ladi?
$e^{\int p(x)dx}$
$e^{-\int p(x)dx}$
$\int p(x)dx$
$e^{\int p^2(x)dx}$

№73.
Qiyinlik darajasi-3

Agar chiziqli differensial tenglama Klero tenglamasi bo‘lsa, uning integral chiziqlari oilasi nimadan iborat bo‘ladi?
To‘g‘ri chiziqlar dastasi
Giperbolalar
Aylanalar
Parabolalar

№74.
Qiyinlik darajasi-3

Berilgan tenglamaning tipini aniqlang: $y\sin x + y'\cos x = 1$
Chiziqli
Bernulli
o‘zgaruvchilari ajraladigan
Rikkati

№75.
Qiyinlik darajasi-3

$y' = \dfrac{3y - x^2}{x}$ tenglamani yechimini aniqlang
$y = cx^3 + x^2$
$y = cx + x^2$
$y = cxe^x$
$y = cx^2 + 2x^3$

№76.
Qiyinlik darajasi-3

$\left(2xy + 3x^2\right)dx + x^2dy = 0$ tenglamaning umumiy yechimini toping
$x^2y + x^3 = c$
$x^2y + y^3 = c$
$x^3y - x = c$
$\dfrac{x}{y} + x^3 = c$

№77.
Qiyinlik darajasi-3

Qanday almashtirish yordamida $y' = y^2 - \dfrac{2}{x^2}$ tenglamani bir jinsli tenglamaga keltirish mumkin?
$y = zx^{-1}$
$y = zx$
$z = y^2$
$z = \sqrt{y}$

№78.
Qiyinlik darajasi-3

Quyidagi tenglama qaysi tipga tegishli $\left(x\cos y - y^2\right)dy + \left(\sin y + x\right)dx = 0$
to‘la differensial

Bernulli
x ga nisbatan chiziqli
hosilaga nisbatan yechilmagan

№79.
Qiyinlik darajasi-2

Boshlang‘ich shartli masala nechta yechimga ega $y' = xy - y^3,\ y(0) = 0$
1
2
3
yechimga ega emas

№80.
Qiyinlik darajasi-2

Tenglamaning tipini aniqlang $xy' = y - xe^{\frac{y}{x}}$
Bir jinsli
Bernulli
Chiziqli
to‘la differensial

№81.
Qiyinlik darajasi-3

Ushbu $y' = \dfrac{y}{3x - y^2}$ tenglamaning yechimini toping
$x = cy^3 + y^2$
$y = 3x^3 + cx^2$
$y = cx^3 + x^2$
$y = cx + x^2$

№82.
Qiyinlik darajasi-2

Ushbu $y = cx^2$ chiziqlar sinfning differensial tenglamasini toping
$xy' = 2y$
$y' = y^{\frac{2}{x}}$
$y'x = 3y$
$y'x^2 = y^2$

№83.
Qiyinlik darajasi-1

Qaysi shart bajarilganda $y' = a(x)y^2 + b(x)y + c(x)$ Rikkati tenglamasi Bernulli tenglamasiga aylanadi?
$c(x) = 0$
$b(x) = 0$
$a(x) = 0$
$a(x) = 1$

№84.
Qiyinlik darajasi-1

Qaysi shart bajarilganda $y' = a(x)y^2 + b(x)y + c(x)$ Rikkati tenglamasi chiziqli tenglamaga aylanadi?
$a(x) = 0$
$b(x) = 0$
$c(x) = 0$
$a(x) = 1$

№85.
Qiyinlik darajasi-1

$y' = f(y) \cdot g(y)$ differensial tenglama tipini toping
O'zgaruvchilari ajraladigan differensial tenglama
Chiziqli tenglama
Bernulli tenglamasi
Rikatti tenglamasi

№86.
Qiyinlik darajasi-1

$x' = \dfrac{x}{y}$ ko'rinishga keltiruvchi differensial tenglama qanday differensial tenglama deb ataladi?
O'zgaruvchilari ajraladigan
Chiziqli tenglamalar
Bir jinsli tenglamalar
Bernulli tenglamasi

№87.
Qiyinlik darajasi-2

$y' = p(x)y$ differensial tenglamaning umumiy yechim formulasini toping
$y = Ce^{\int p(x)dx}$
$y = \varphi(x)$
$y = e^{\int p(x)dx}$
$y = C$

№88.
Qiyinlik darajasi-2

$\varphi(x, y, C_1, C_2) = 0$ egri chiziqlar oilasining differensial tenglamasini tuzish uchun bu tenglamani necha marta diffrensiallash kerak ?
2
3
1
0

№89.
Qiyinlik darajasi-2

Agar $M(x, y)dx + N(x, y)dy = 0$ differensial tenglamada $M(x, y)$ *va* $N(x, y)$ bir xil tartibdagi bir jinsli funksiyalar bo‘lsa tenglama turini toping?
Bir jinsli tenglamalar
O‘zgaruvchilari ajraladigan tenglama
Chiziqli tenglamalar
Tuliq differensialli tenglama

№90.
Qiyinlik darajasi-1

$x' + g(t)x = f(t)x^k$ tenglamani turini aniqlang
Bernulli tenglamasi
Chiziqli tenglama
O‘zgaruvchilari ajraladigan tenglama
Klero tenglamasi

№91.
Qiyinlik darajasi-1

$y' = f(x, y)$ differensial tenglama $y(x_0) = y_0$ shart bilan yechimini topishga qanday masala deyiladi?
Koshi masalasi
Chegaraviy masala
Umumiy yechimni topish
Maxsus yechimni topish

№92.
Qiyinlik darajasi-1

$kx^2 + y^2 + xy' = 0$ differensial tenglamani tartibini toping
1
3
2
0

№93.
Qiyinlik darajasi-2

$y' \cdot e^{x^2} = x \cdot e^{x^2} - y$ tenglama turini aniqlang
Bir jinsli bulmagan chiziqli differensial tenglama
Bernulli tenglamasi
Klero tenglamasi
O‘zgaruvchilari ajraladigan tenglama

№94.
Qiyinlik darajasi-2

Qaysi shart bajarilganda $M(t, x)dt + N(t, x)dx = 0$ tenglama to‘liq differensialli bo‘ladi
$\frac{\partial M}{\partial x} = \frac{\partial N}{\partial t}$
$M(t, x) = x^2$
$N(t, x) = y$
$M(t, x) = N(t, x)$

№95.
Qiyinlik darajasi-2

$y' = a(x) \cdot y^2 + b(x) \cdot y + c(x)$ Rikatti tenglamasini bitta xususiy yechimi berilgan bo‘lsa, uni qanday turdagi tenglamaga keltirish mumkin?
Bernulli tenglamasiga
O‘zgaruvchilari ajraladigan tenglamaga
Chiziqli tenglamalarga
Rikatti tenglamasiga

№96.
Qiyinlik darajasi-2

Ushbu $x' + p(t)x = f(t)x^m$ Bernulli tenglamasini m ning qanday qiymatida chiziqli differensial tenglama bo‘ladi?
0
1
2
-1

№97.
Qiyinlik darajasi-2

Ushbu $\frac{dx}{dt} = p(t) \cdot x + f(t) \cdot x^m$ Bernulli tenglamasi m ning qaysi qiymatida chiziqli bir jinsli diffrensial tenglamaga aylanadi?
1
2
3
0

№98.
Qiyinlik darajasi-1

Birinchi tartibli chiziqli differensial tenglamaning umumiy yechimi nechta ixtiyoriy o‘zgarmaslarga bog‘liq?
1
2
3
0

№99.
Qiyinlik darajasi-1

Birinchi tartibli chiziqli bir jinsli differensialtenglamaningumumiy yechim strukturasi qaysi?
$y = c \cdot \varphi(x)$
$y = g(x)$
$y = 1$
$y = c \cdot \varphi(x) + g(x)$

№100.
Qiyinlik darajasi-1

Birinchi tartibli chiziqli bir jinsli bo’lmagan differensial tenglamaning umumiy yechim strukturasi qaysi?

$y = c \cdot \varphi(x) + g(x)$
$y = g(x)$
$y = 1$
$y = c \cdot \varphi(x)$

№101.
Qiyinlik darajasi-3

$y' + y = 7$ differensial tenglamaning xususiy yechimini toping
7
7x
e^x
0

№102.
Qiyinlik darajasi-1

Birinchi tartibli diffrensial tenglamaning umumiy yechimi formulasini toping
$y = \varphi(x, C)$
$f(x, C) = 0$
$y = y(x)$
$x = x(y)$

№103.
Qiyinlik darajasi-2

Birinchi tartibli $y' = \varphi\left(\frac{y}{x}\right)$ bir jinsli tenglama $y = xz$ almashtirish natijasida, qanday turdagi tenglamaga kelishini toping
O‘zgaruvchilari ajraladigan tenglamaga
Chiziqli tenglama
Bernulli tenglamasiga
To‘liq differensial tenglamaga

№104.
Qiyinlik darajasi-1

$y = xy' + \psi(y')$ differensial tenglamani turini aniqlang
Klero tenglamasi
Chiziqli tenglamalar
O‘zgaruvchilari ajraladigan tenglama
Lagranj tenglamasi

№105.
Qiyinlik darajasi-1

$y = \varphi(y')x + \psi(y')$ differensial tenglamani turini aniqlang
Lagranj tenglamasi
Chiziqli tenglamalar
O‘zgaruvchilari ajraladigan tenglama
Klero tenglamasi

№106.
Qiyinlik darajasi-2

Xarakteristik tenglamasi $\lambda^2+3\lambda+2=0$ bo‘lgan o‘zgarmas koeffitsientli chiziqli bir jinsli tenglamani toping
$y''+3y'+2y=0$ $y''+y'=0$
$y''+3y'=0$
$y''=0$

№107.
Qiyinlik darajasi-2

$F(x,y^{(k)},y^{(k+1)}...y^{(n)})=0$ tenglamaning tartibini pasaytirish uchun qanday almashtirish bajariladi?
$y^{(k)}=z$
$y^{(k-1)}=z$
$y'=z$
$y^{(n)}=z$

№108.
Qiyinlik darajasi-2

$F(y,y',y'',...,y^{(n)})=0$ .. $(n\geq 2)$ tenglamaning tartibini pasaytirish qanday almashtirish bajariladi?
$y'=p(y)$
$y^{(n+1)}=z$
$y^{(n)}=z$
$y'p=z$

№109.
Qiyinlik darajasi-3

$F(x,y,y',...,y^{(n)})=0$ tenglamada qaysialmashtirish bajarilsa, y va uning hosilalariga nisbatan bir jinsli deyiladi
Agar y ning o‘rniga ky, y' ning o‘rniga ky', va h.k. $y^{(n)}$ ning o‘rniga $ky^{(n)}$ qo‘yilganda tenglama o‘zgarmasa
Agar y va uning bir necha tartibli xosilalari qatnashmasa
Agar x argument qatnashmasa
Agar x ning o‘rniga kx, y' ning o‘rniga ky', va h.k. $y^{(n)}$ ning o‘rniga $ky^{(n)}$ qo‘yilganda tenglama o‘zgarmasa

№110.
Qiyinlik darajasi-3

$a_0 x^n y^{(n)} + a_i x^{n-1} y^{y-1} + ...$ $.. + a_{n-1} y^{/} + a_n y = 0$ (bu yerda a_i – o‘zgarmas son) Eyler tenglamasining harakteristik tenglamasini yozing
$a_0\lambda(\lambda-1)(\lambda-2)...(\lambda-n+1)+ +a_1\lambda(\lambda-1)(\lambda-2)....(\lambda-n+2)+ +....a_{n-1}\lambda+a_a=0$
$a_0\lambda^{n-1} + a_1\lambda^{n-2} + ... + a_{n-1} = 0$
$a_0\lambda^n + a_i\lambda^{n-1} + ... + a_{n-1}\lambda + a_n = 0$
$a_0\lambda(\lambda-1) + a_1(\lambda-1)(\lambda-2) + .. + ... + a_{n-1}(\lambda-n) + a_n = 0$

№111.
Qiyinlik darajasi-3

$a_0(x)y^{//} + a_1(x)y^{/} +$ $+ a_2(x)y = f(x)$ $x_0 \le x \le x_1$ tenglama uchun umumiy chegaraviy masalani yozing
$\alpha y^{/}(x_0) + \beta y(x_0) = 0,$ $\gamma y^{/}(x_1) + \delta y(x_1) = 0$
$J^{/}(x_0) = Y_0$
$y(x_1) = y_1$
$y(x_0) = y$

№112.
Qiyinlik darajasi-3

$a_0(x)y^n + a_1(x)y^{/} + a_2(x)y = f(x)$ tenglama uchun umumiy chegaraviy masalaning Grin funksiyasi ko‘rinishini yozing ($y_1(x)$ va $y_2(x)$ – tenglamani yechimlari)
$G(x,s) = \begin{cases} a(s)y_1(x), x_0 \le x \le s \\ b(s)y_2(x), s \le x \le x_1 \end{cases}$
$G(x,s) = \begin{cases} a(s) + y_1(x), x_0 \le x \le s \\ b(s)y_2(x), s \le x \le x_1 \end{cases}$
$G(x,s) = \begin{cases} \dfrac{a(s)}{y_1(x)}, x_0 \le x \le s \\ \dfrac{b(s)}{y_2(x)}, s \le x \le x_1 \end{cases}$
$G(x,s) = \begin{cases} a(s)y_1(x), x_0 \le x \le s \\ b(s)y_2(x), s \le x \le x_1 \end{cases}$

№113.
Qiyinlik darajasi-3

$y^{//} = f(x),\ y(0) = 0,\ y(1) = 0$ chegarviy masalaning Grin funksiyasini ko‘rosating

$G(x,s)=\begin{cases}(s\ \ -1)x \\ s(x\ \ -1)\end{cases}$ $0\le x\le s$ $s\le x\le 1$
$G(x,s)=\begin{cases}s^2 x \\ s(x+1)\end{cases}$, $0\le x\le s$ $s\le x\le 1$
$G(x,s)=\begin{cases}(s^2-1)x \\ s(x^2-1)\end{cases}$, $0\le x\le s$ $s\le x\le 1$
$G(x,s)=\begin{cases}(s+1)x \\ s(x+1)\end{cases}$, $0\le x\le s$ $s\le x\le 1$

№114.
Qiyinlik darajasi-3

$G(x,s)=\begin{cases}SinsCosx & 0\le x\le s \\ SinxCoss & s\le x\le \pi\end{cases}$ ko‘rinishdagi Grin funksiyasi qaysi chegaraviy masalaga tegishli?
$y'' + y = f(x),\ y'(0)=0,\ y(\pi)=0$
$y'' + f(x),\ y(0)=0,\ y(1)=0$
$y'' - y = f(x),\ y'(0)=0,\ y(1)=0$
$y'' + y = f(x),\ y'(0)=y(\pi),$ $y(1)=0$

№115.
Qiyinlik darajasi-3

$y^{//} = \lambda y, y(0) = 0, y(l) = 0$ masalaning hos qiymati va hos funksiyalarini toping
$\lambda_k = -\left(\frac{\pi k}{2}\right)^2,$ $y_k(x) = Sin\frac{\pi k}{e}x$ $k = 1,2,3$
$\lambda_k = \left(\frac{\pi k}{2}\right)^2,$ $y_k(x) = Cos\frac{\pi k}{e}x$
$\lambda_k = \left(\frac{2\pi}{3}k\right)^2,$ $y_k(x) = Sin\frac{\pi k}{e}x$
$\lambda_k = -\left(\frac{\pi k}{2}\right)^2,$ $y_k = Cos\frac{\pi k}{e}x$

№116.
Qiyinlik darajasi-3

Agar o‘zgarmas koeffitsentli yuqori tartibli chiziqli tenglamaning o‘ng tomoni $P_m(x)e^{\gamma x}, (P_m(x) - ko' pxad)$ ko‘rinishida bo‘lsa, bitta hususiy yechim qaysi ko‘rinishda bo‘ladi? (Hamma javoblarda s – karralilikni bildiradi)
$y_1 = x^s Q_m(x)e^{\gamma x}$
$y_1 = x^{s-1} Q_m(x)e^{\gamma x}$
$y_1 = x^{s+1} Q_m(x)e^{\gamma x}$
$y_1 = Q_{m+s}(x)e^{\gamma x}$

№117.
Qiyinlik darajasi-2

$a_0 x^n a y^{(n)} + a_1 x^{n-1} y^{(n-1)} + ...$ $... + a_{n-1} x y^{/} + a_n y = f(x)$ ko‘rinishidagi Eyler tenglamasini o‘zgarmas koeffitsientli chiziqli tenglamaga keltirish uchun qanday almashtirish bajariladi? ($x > 0$ deb faraz qiling)
$x = e^t$

$x = e^{-t}$
$x = \ln\lvert t\rvert$
$x = \ln\lvert t\rvert + e^{t}$

№118.
Qiyinlik darajasi-3

$a_0(x)y'' + a_1(x)y' + a_2(x)y = 0$ tenglamani yechishda ushbu Ostrogradskiy –Liuvill formulasi qo‘llaniladi: $\begin{vmatrix} y_1 & y_2 \\ y_1' & y_2' \end{vmatrix} = Ce^{-\int p(x)dx}$ bu formuladagi $p(x)$ deb nimaga teng?
$p(x) = \frac{a_1(x)}{a_0(x)}$
$p(x) = -\frac{a_1(x)}{a_0(x)}$
$p(x) = -\frac{a_0(x)}{a_1(x)}$
$p(x) = a_0(x)$

№119 .
Qiyinlik darajasi-2

Quyidagi funksiyalardan qaysi biri chiziqli bog‘liq?
$6x + 9,\ 8x + 12$
$x + 2, x - 2$
$Sinx,\ Cosx$
$x^2 + 2x,\ 3x^2 - 1, x + 4$

№120.
Qiyinlik darajasi-2

$(2x+1)y'' + 4xy' - 4y = 0$ tenglamaning bitta xususiy yechimini toping
e^{-2x}
e^{-2x^2}
e^{x}

x^3

№121.
Qiyinlik darajasi-3

Ushbu $(x-a)^2+by^2=1$ chiziqlar oilasi qaysi diffirensial tenglamaning yechimi?
$(yy''+y'^2)^2=-y^3y''$
$2yy''+y'^2=\sqrt{yy''}$
$yy''+y'^2=0$

№122.
Qiyinlik darajasi-3

Yechimni $y_1=ax+b$ ko‘rinishda izlab, $x^2y''\ln x-xy'+y=0$ tenglamaning bitta xususiy yechimini toping
$y_1=x$
$y_1=2x+1$
$y_1=2x-1$
$y_1=x+2$

№123.
Qiyinlik darajasi-3

$y''+4y'+3y=0$ tenglamaning umumiy yechimini yozing
$y=c_1e^{-x}+c_2e^{-3x}$
$y=c_1e^{-x}+c_2e^{3x}$
$y=c_1e^{x}+c_2e^{-3x}$
$y=c_1e^{x}+c_2e^{3x}$

№124.
Qiyinlik darajasi-3

$y''+2y'+10y=0$ tenglamaning umumiy yechimini yozing
$y=e^{-x}(C_1Cos3x+C_2Sin3x)$
$y=e^{3x}(C_1Cosx+C_2Sinx)$
$y=e^{x}(C_1Cos3x+C_2Sin3x)$
$y=e^{2x}(c_1Cos2x+c_2Sin2x)$

№125.
Qiyinlik darajasi-3

$y'' - 2y' + y = 0$ tenglamaning umumiy yechimini yozing
$y = (c_1 + c_2 x)e^x$
$y = (c_1 + c_2)e^x$
$y = (c_1 + c_2 x^2)e^x$
$y = c_1 e^x + c_2 e^{-x}$

№126.
Qiyinlik darajasi-3

$y'' - 2y' - 3y = x^2 e^x$ tenglamaning bitta xususiy uchimi qanday ko‘rinishda izlanadi
$y = x(Ax^2 + Bx + c)e^x$
$y = (Ax^2 + Bx + c)e^x$
$y = x^2(Ax + B)e^x$
$y = Ax^2 e^x$

№127.
Qiyinlik darajasi-3

$y'' - 4y' + 8y = Sin2x$ tenglamaning bitta xususiy yechimi qaysi ko‘rinishda bo‘ladi?
$y = ASin2x + BCos2x$
$y = (Ax + B)Sin2x + +(cx + B)Cosx$
$y = Ax^2 Sin2x + BxCosx$
$y = x(ASin2x + BCos2x)$

№128.
Qiyinlik darajasi-3

a va $b$ning qanday qiymatlarida $y'' + ay' + by = 0$ tenglamaning yechimlari $-\infty \prec x \prec \infty$ da chegaralangan bo‘ladi?
$a = 0$ $b > 0$
$a = 0$ $b < 0$
$a > 0$ $b > 0$
$a < 0$ $b < 0$

№129.
Qiyinlik darajasi-3

a va *b*ning qanday qiymatlarida $y'' + ay' + by = 0$ tenglamaning hamma yechimlari $x \to +\infty$ da nolga intiladi?
$a > 0$ $b > 0$
$a = 0$ $b < 0$
$a = 0$ $b > 0$
$a < 0$ $b < 0$

№130.
Qiyinlik darajasi-3

$x^3 y''' + xy' - y = 0$ Eyler tenglamasini yeching
$y = x\left(c_1 + c_2 \ln\lvert x\rvert + c_3 \ln^2\lvert x\rvert\right)$
$y = c_1 + c_2 \ln\lvert x\rvert + c_3 \ln^2\lvert x\rvert$
$y = x^2\left(c_1 + c_2 \ln\lvert x\rvert + c_3 \ln^2\lvert x\rvert\right)$
$y = c_1 + c_2 x + c_3 x^2$

№131.
Qiyinlik darajasi-3

$y''' - y' = 3\left(2 - x^2\right)$ tenglamani bitta xususiy yechimi qanday ko‘rinishda izlanadi?
$y = \left(Ax^2 + Bx + c\right)x$
$y = \left(Ax^2 + Bx + c\right)x^2$
$y = \left(Ax^2 + Bx + c\right)e^x$
$y = \left(Ax + B\right)e^x$

№132.
Qiyinlik darajasi-3

Quyidagi tenglamalardan qaysi biri Eyler tenglamasi hisoblanadi?
$x^2 y'' - 9xy' + 21y = 0$
$xy'' + y' + y = 0$
$x^2 y'' + xy' + \frac{1}{x} y = 0$
$xy'' - 9y' + 21xy = 0$

№133.
Qiyinlik darajasi-3

y_1 va $y_2 = c_1 y_1 \int e^{-\int p(x)dx} \frac{dx}{y_1^2}$ funksiyalar qaysi tenglamaning ikkita chiziqli erkli yechimlari bo‘ladi?

$y'' + y' \cdot p(x) + yQ(x) = 0$
$y'' - y' \cdot p(x) + y^2 Q(x) = 0$
$y'' - y' p(x) + yQ(x) = 0$
$y'' + y' p^2(x) + yQ(x) = 0$

№134.
Qiyinlik darajasi-3

$y'' + 16y = 0$ tenglamaning umumiy yechimini toping
$y = c_1 \cos 4x + c_2 \sin 4x$
$y = ce^{-16x}$
$y = c_1 e^{4x} + c_2 e^{-4x}$
$y = c_1 e^{-4x} \cos 4x + c_2 e^{-4x} \sin 4x$

№135.
Qiyinlik darajasi-3

$y'' + 4y = 0$ tenglamaning umumiy yechimini toping
$y = c_1 \cos 2x + c_2 \sin 2x$
$y = c_1 e^{2x} + c_2 e^{-2x}$
$y = ce^{-4x}$
$y = c_1 \cos 2x + c_2 x \cos 2x$

№136.
Qiyinlik darajasi-2

Berilgan differensial tenglamaning xususiy yechimini aniqlang: $y''' - y'' = 5x^2 + 4$
$y_1 = \frac{5}{12} x^4 - \frac{5x^3}{3} + 7x^2$
$y_1 = 5x^4 + 4x^2$
$y_1 = 5x^2 + 4$
$y_1 = ax^2 + bx + c$

№137.
Qiyinlik darajasi-2

Berilgan tenglamaning tipini aniqlang: $\left(x + 3x^2\right) y' + xy = 0$
o‘zgaruvchilari ajraladigan
to‘la differensial
Bernulli
y ga nisbatan chiziqli

№138.
Qiyinlik darajasi-3

Xususiy yechimi $y_1 = xe^x$ bo‘lgan chiziqli o‘zgarmas koeffitsientli differensial tenglamani ko‘rsating
$y'' - 2y' + y = 0$
$y'' - 2y' - 3y = 0$
$y' - y = 0$

$y'' + 2y' + y = 0$

№128.
Qiyinlik darajasi-3

Xususiy yechimi $y_1 = x^2 e^{-x}$ bo‘lgan chiziqli o‘zgarmas koeffitsientli differensial tenglamani ko‘rsating
$y''' + 3y'' + 3y' + y = 0$
$y''' - y' = 0$
$y'' - y = 0$
$y''' + 3y'' = 0$

№129.
Qiyinlik darajasi-3

Xususiy yechimni aniqmas koeffitsientlar usuli bilan toping $y'' - 5y' + 4y = 4x^2 e^{2x}$
$y = \left(ax^2 + bx + c\right)e^{2x}$
$y = x\left(ax^2 + bx + c\right)e^{2x}$
$y = x\left(ax + b\right)e^{2x}$
$y = ax^2 e^{2x}$

№130.
Qiyinlik darajasi-2

$y'^n + a_1(x, y) \cdot y'^{n-1} + ... + a_{n-1}(x, y)y' + a_n(x, y) = 0$ tenglama tartibini aniqlang
1
2
3
n

№131.
Qiyinlik darajasi-3

$y'^n + a_1(x, y) \cdot y'^{n-1} + ... + a_n(x, y) = 0$ differensial tenglamani turini aniqlang
Birinchi tartibli n darajali
Chiziqli tenglamalar
Bernulli tenglamasiga
O‘zgaruvchilari ajraladigan tenglama

№132.
Qiyinlik darajasi-3

Fundamental yechimlar sistemasi $\cos x$ va $\sin x$ bo‘lgan differensial tenglamani toping
$y'' + y = 0$
$y'' - y' = 0$
$y''' + y' = 0$
$y'' = 0$

№133.
Qiyinlik darajasi-3

$y''+3y'+2y=0$ tenglamaning xarakteristik sonlarini toping
-2, -1
2,1
-2
-1

№134.
Qiyinlik darajasi-3

$y''+y'=0$ tenglamaning xususiy yechimini toping
e^{-x}
x
x^2
e^x

№135.
Qiyinlik darajasi-3

$y''+3y'+2y=6$ tenglamaning xususiy yechimini toping
3
0
x
x^2

№136.
Qiyinlik darajasi-3

n
2
1
0

№137.
Qiyinlik darajasi-3

$n-$ tartibli differensialli tenglamalarning umumiy yechimi nechta ixtiyoriy o‘zgarmasga bog‘liq
Quyidagi differensial tenglamaning $xy''+y'^3=x^4$ tartibini toping
2
4
0
3

№138.
Qiyinlik darajasi-3

Ushbu $x^2y''-2xy'+2y=0$ Eyler tenglamasining yechimlar fundamental sistemasini toping
x, x^2
1, x
$x,\ x^3$
2, x^2

№139.

Qiyinlik darajasi-3

Quyidagi $ay''+3xy'+5y=f(x)$ Eyler tenglamasi bo‘lishi uchun a nimaga teng bo‘lishi kerak?
x^2
x
1
0

№140.
Qiyinlik darajasi-3

Agar e^{2ix} kompleks funksiya $y''+4y=0$ tenglamaning yechimi bo‘lsa, unda uning haqiqiy yechimlari qaysi funksiyalar bo‘ladi?
$\sin 2x,\ \cos 2x$
$2,\ \cos x$
$\cos x,\ \sin 2x$
$\cos x,\ \sin x$

№141.
Qiyinlik darajasi-3

O‘zgarmas koeffitsientli ikkinchi tartibli chiziqli bir jinsli differensial tenglamaning xususiy yechimi $e^{2x}\cos 3x,\ \ e^{2x}\sin 3x$ bu tenglamaning xarakteristik sonlarini toping
$2\pm 3i$
2,3
$1\pm 2i$
$3\pm 2i$

№142.
Qiyinlik darajasi-2

$x^2y''+a_1xy'+a_2xy=0$ tenglama turini toping
Eylerning ikkinchi tartibli bir jinsl tenglamasi
Bernulli tenglamasi
O‘zgarmas koeffitsientli chiziqli tenglama
Eylerning bir jinsli

№143.
Qiyinlik darajasi-2

Ikkinchi tartibli chiziqli bir jinsli differensial tenglamaning yechimlar fundamental sistemasi y_1 va y_2 bo‘lsa, umumiy yechim formulasini toping
$y=c_1y_1+c_2y_2$
$y=\varphi(x,c_1,c_2)$
$\varphi(x,y,c_1,c_2)=0$
$y=\varphi(x,\ c)$

№144.
Qiyinlik darajasi-3

$L[y]=y''+3y'-4y$ bo‘lsa, $L[e^x]$ ni toping
0
8
1

-7

№145.
Qiyinlik darajasi-2

Xarakteristik soni 2 va 3 bo‘lgan, differensial tenglamani toping
$y''-5y'+6y=0$
$y''+y'+y=0$
$y''+y=0$
$y'''=0$

№146.
Qiyinlik darajasi- 2

2-chi tartibli differensial tenglamaning umumiy yechimi nechta ixtiyoriy o‘zgarmaslarga bog‘liq?
2
1
3
n

№147.
Qiyinlik darajasi-3

$L[y]=y''+3y'$ bo‘lsa, $L[e^x]$ ni toping
$4e^x$
e^{2x}
$3e^x$
4

№148.
Qiyinlik darajasi-3

n–tartibli differensialli tenglamaning oshkormas ko‘rinishdagi umumiy yechimini toping
$\varphi(x,y,c_1,...,c_n)=0$
$y=\varphi(x,\ c)$
$\varphi(x,y)=0$
$y=y(x)$

№149.
Qiyinlik darajasi-3

n–tartibli differensial tenglamaning parametr ko‘rinishdagi umumiy yechimini toping
$x=x(t),$ $y=y(t,c_1,c_2,...,c_n)$
$y=\varphi(x,c)$
$\varphi(x,y)=0$
x $\varphi(x,y)=0$

№150.
Qiyinlik darajasi-3

$y''+y=0$ differensial tenglamaning yechimlarining fundamental sistemasini toping
$\sin x,\ \cos x$

$e^x,\ e^{-x}$
$\cos x,\ \sin 2x$
e^x

№151.
Qiyinlik darajasi-3

$x^k y''+axy'+by=0$ tenglama k ning qiymatida Eyler tenglamasi bo‘ladi
2
1
3
5

№152.
Qiyinlik darajasi-3

$L[y]=y''+y$ bo‘lsa $L[\cos x]$ ni toping
0
$\cos 2x$
2
$\sin 2x$

№153.
Qiyinlik darajasi-3

$1,\ x$ funksiyalarning Vronskiy determinantini toping.
1
0
-1
x

№154.
Qiyinlik darajasi-2

$F(x, y^{(k)})=0$ differensial tenglama yuqori hosilaga nisbatan yechiladigan bo‘lsa integrallash usulini toping:
k - marta ketma-ket integrallab
$x=y^{(k)}$
To‘g‘ri javob yo‘q
$y'=z$

№155.
Qiyinlik darajasi-2

$F(y, y', y'',..., y^{(n)})=0$ tenglama tartibi $y'=p(y)$ almashtirish orqali necha birlikga pasaytiriladi.
1
0
2
3

№156.
Qiyinlik darajasi-3

$\sin x, \cos x$ funksiyalarining Vronskiy determinantini toping.

-1
1
0
cos2x

№157.
Qiyinlik darajasi-3

$y = x^3 + C_1 x + C_2$ oilaning differensial tenglamasini toping.
$y'' = 6x$
$y' = 3x^2 + C$
$y' = f(x, y)$
$y'' + y = 0$

№158.
Qiyinlik darajasi-3

Agar $W[1, tgx]$ bo‘lsa ,Vronskiy determinantining $W(0)$ qiymatini toping
1
-1
X
2

№159.
Qiyinlik darajasi-3

Vronskiy determinantining $W(0)$ qiymatini toping, agar $W[e^x, e^{-x}]$ bo‘lsa:
-2
1
-1
x

№161.
Qiyinlik darajasi-2

$x = e^t, y = -e^t$ funksiya quyidagi tenglamalar sistemalaridan qaysi birining yechimi bo‘ladi?
$\dot{x} = 2x + y$ $\dot{y} = 3x + 4y$
$\dot{x} = x + y$ $\dot{y} = 3y - 2x$
$\dot{x} = x - y$ $\dot{y} = y - 4x$
$\dot{x} = x - 3y$ $\dot{y} = 3x + y$

№162.
Qiyinlik darajasi-3

$\begin{cases} y' = \dfrac{x}{z} \\ z' = -\dfrac{x}{z} \end{cases}$ nochiziqli sistemaning umumiy yechimini ko‘rsating
$y = c_2 e^{c_1 x^2}$, $z = \dfrac{1}{2c_1 c_2} e^{-c_1 x^2}$
$y = c_2 e^{c_1 x}$, $z = \dfrac{1}{2c_1 c_2} e^{-c_1 x^2}$
$y = c_1 c_2 e^{x^2}$, $z = \dfrac{1}{2c_1 c_2} e^{-c_1 x^2}$
$y = c_2 e^{x^2}$, $z = \dfrac{1}{2c_1 c_2} e^{c_1 x^2}$

№163.
Qiyinlik darajasi-3

$\begin{cases} \dot{x} = y + 2x \\ \dot{y} = 3x + 4y \end{cases}$ tenglamalar sistemasini yechimini ko‘rsating
$x = c_1 e^{t} + c_2 e^{5t}$ $y = -c_1 e^{t} + 3c_2 e^{5t}$
$x = c_1 e^{-t} + c_2 e^{5t}$ $y = -c_1 e^{-t} + 3c_2 e^{-5t}$
$x = c_1 e^{t} + c_2 e^{5t}$ $y = c_1 e^{t} + 3c_2 e^{5t}$
$x = c_1 e^{t} + 2c_2 e^{5t}$ $y = -c_1 e^{t} + 3c_2 e^{5t}$

№164.
Qiyinlik darajasi-3

$\begin{cases} \ddot{x} = y \\ \ddot{y} = x \end{cases}$ tenglamalar sistemasining nechta chiziqli bog‘liqsiz yechimlari bor?
4 ta
3 ta
2 ta
1 ta

№165.
Qiyinlik darajasi-2

$\left.\begin{aligned} \frac{dx}{dt} &= f(t,x,y), \\ \frac{dy}{dt} &= g(t,x,y), \end{aligned}\right\}$ normal sistemaning umumiy yechimi nechta ixtiyoriy o‘zgarmaslarga bog‘liq
2
3
1
0

№166.
Qiyinlik darajasi-2

Qaysi holda normal sistema avtonom (statsionar) sistema deyiladi
Agar sistemaning o’ng tamonidagi funksiyalar oshkor holda t – ga bog’liq bo’lmasa
Agar normal funksiyalar soni ikkita bo‘lsa
To‘g‘ri javob yo‘q
Agar sistemaning ung tamonidagi funksialar t – ga bog’liq bo‘lsa

№167.
Qiyinlik darajasi-3

$\left.\begin{aligned} \frac{dx}{dt} &= f(t,x), \\ \frac{dy}{dt} &= g(t,y), \end{aligned}\right\}$ sistemani qaysi usul bilan integrallashini toping
Sistema tenglamalarini har biri alohida integrallash kerak
To‘g ‘ri javob yo‘q
Bitta ikkinchi tartibli tenglamaga keltirib integrallash kerak
Integrallovchi kombinatsiya tuzib integrallash kerak

№168.
Qiyinlik darajasi-3

$\left.\begin{aligned} \frac{dx}{dt} &= f(t,x), \\ \frac{dy}{dt} &= g(t,x,y), \end{aligned}\right\}$ sistemani qaysi usul bilan integrallashini toping
Sistema tenglamalarini ketma-ket integrallash kerak
Sistema tenglamalarini har biri alohida integrallash kerak
Bitta ikkinchi tartibli tenglama keltirib integrallash kerak
Integrallovchi kombinatsiya tuzib integrallash kerak

№169.
Qiyinlik darajasi-3

$\frac{dx}{dt} = p(t)x + f(t),$ $\frac{dy}{dt} = g(t)x + h(t)y + e(t),$ Chiziqli tenglamalar sistemasi qaysi usul bilan integrallanishini toping
Sistema tenglamalarini ketma-ket integrallash kerak
Sistema tenglamalarini har biri alohida integrallash kerak
Bitta ikkinchi tartibli tenglama keltirib integrallash kerak
Integrallovchi kombinatsiya tuzib integrallash kerak

№170.
Qiyinlik darajasi-2

$\left.\begin{array}{l} \frac{dx}{dt} = f(t,x,y,z), \\ \frac{dx}{dt} = g(t,x,y,z), \\ \frac{dz}{dt} = h(t,x,y,z), \end{array}\right\}$ normal sistema tartibini toping
3
2
1
4

№171.
Qiyinlik darajasi-2

$xy''+y'+xy=0$ tenglamaning nechta differensial tenglamaning normal sistemaga keltirishini toping
2
1
3
4

№172.
Qiyinlik darajasi-2

$\left.\begin{array}{l} y''-z=0, \\ z''+y=0, \end{array}\right\}$ differensial tenglamalar sistemasining tartibini toping
4
3
2
1

№173.
Qiyinlik darajasi-2

$\left.\begin{aligned} \frac{dx}{dt} &= f(t,x,y,z), \\ \frac{dy}{dt} &= g(t,x,y,z), \\ \frac{dz}{dt} &= h(t,x,y,z), \end{aligned}\right\}$ differensial tenglamalar sistemasining turini toping
Oddiy differensial tenglamalarning normal sistemasi
To‘g‘ri javob yo‘q
Chiziqli differensial tenglamalar sistemasi
Simmetrik ko‘rinishdagi odddiy differensial tenglamalar sistemasi

№174.
Qiyinlik darajasi-3

A matritsaning e^A ko‘rsatkichli funksiyani ko‘rsating
$e^A = E + \frac{A}{1!} + \frac{A^2}{2!} + \frac{A^3}{3!} + ...$
$e^A = E + \frac{A}{1} + \frac{A^2}{2} + \frac{A^3}{3} + ...$
$e^A = A + \frac{E}{1!} + \frac{E}{2!} + \frac{E}{3!} + ...$
$e^A = E - \frac{A}{1!} + \frac{A^2}{2!} + \frac{A^3}{3!} + ...$

№175.
Qiyinlik darajasi-3

e^A ko‘rsatkichli funksiya uchun $e^{A+B} = e^A \cdot e^B = e^B \cdot e^A$ tenglik qaysi shartda o‘rinli?
$AB = BA$
$AB \neq BA$
$AB = E$
$A = B + E$
$\frac{dX}{dt} = AX$ matritsali tenglamaning $X(0) = E$ shartni qanoatlantruvchi yechimini toping

№176.
Qiyinlik darajasi-2

$\left.\begin{aligned}\frac{dx}{dt}&=ax+by,\\ \frac{dy}{dt}&=cx+dy,\end{aligned}\right\}$ differensial tenglamalar sistemasining turini toping
Chiziqli differensial tenglamalarning avtonom sistemasi
Oddiy differensial tenglamalarning normal sistemasi
Simmetrik ko‘rinishdagi odddiy differensial tenglamalar sistemasi
To‘g‘ri javob yo‘q

№177.
Qiyinlik darajasi-2

$\begin{cases}\frac{dx}{dt}=ax^k+by^l\\ \frac{dy}{dt}=cx^m+dy^n\end{cases}$ Differensial tenglamalar sistemasining tartibini toping:
2
1
k
n

№178.
Qiyinlik darajasi-3

Agar chiziqli bir jinsli sistemaning har bir yechimi $t\to+\infty$ da nolga intilsa, u holda nol yechim
Asimptotik turg‘un
Turg‘un, lekin asimptotik turg‘un emas
Turg‘un emas
Bunday yechim mavjud emas

№179.
Qiyinlik darajasi-3

Agar chiziqli bir jinsli sistemaning har bir yechimi $t\to+\infty$ da chegaralangan bo‘lsa u holda yechim
Turg‘un, lekin asimptotik turg‘un emas
Turg‘un emas
Asimptotik turg‘un
Bunday yechim mavjud emas

№180.
Qiyinlik darajasi-3

Agar chiziqli bir jinsli sistema hech bo‘lmaganda bitta chegaralanmagan ($t\to+\infty$ da) yechimga ega bo‘lsa, u holda nol yechim
Turg‘un emas
Turg‘un, lekin asimptotik turg‘un emas
Asimptotik turg‘un
Bunday yechim mavjud emas

№181.
Qiyinlik darajasi-3

Agar sistemaning birorta yechimi Lyapunov ma’nosida turg‘un bo‘lsa, u holda bu sistemaning
Hamma yechimlari turg‘un

Qolgan yechimlari turg‘un emas
Hamma yechimlari asimptotik turg‘un
Ba’zi yechim turg‘un

№182.
Qiyinlik darajasi-3

$\begin{cases} \dfrac{dx}{dt} = 2x \\ \dfrac{dy}{dt} = 2x + 3y \end{cases}$ Differensial tenglamalar sistemasinig muvozanat nuqtasining turini aniqlang
Egar
Markaz
Tugilma tugun
Fokus

№183.
Qiyinlik darajasi-3

$\begin{cases} \dfrac{dx}{dt} = 2x \\ \dfrac{dy}{dt} = x + y \end{cases}$ Differensial tenglamalar sistemasinig muvozanat nuqtasining turini aniqlang
Tugun
Markaz
Tugun
Fokus

№184.
Qiyinlik darajasi-3

$\begin{cases} \dot{x} = 2x + y \\ \dot{y} = 2x \end{cases}$ 0 nuqtaning tipini aniqlang
Egar
Markaz
Tugun
Fokus

№185.
Qiyinlik darajasi-3

$\begin{cases} \dot{x} = 2x + y \\ \dot{y} = x + 3y \end{cases}$ sistemaning muvozanat nuqtasining turini aniqlang
Tugun
Markaz
Egar
Fokus

№186.

Qiyinlik darajasi-3

$\begin{cases} \dot{x} = 2x - y \\ \dot{y} = x \end{cases}$ sistemaning muvozanat nuqtasining turini aniqlang
Tug‘ilma tugun
Tugun
Fokus
Egar

№187.
Qiyinlik darajasi-3

$\begin{cases} \dot{x} = 3x + 2y \\ \dot{y} = x - 4y \end{cases}$ sistemaning muvozanat nuqtasining turini aniqlang
Fokus
Egar
Tugun
Markaz

№188.
Qiyinlik darajasi-3

Nochiziqli sistemalarni yechishda integrallanuvchi kombinatsiyalarni topiladi Bunda teng kasrlar hossasidan foydalaniladi Agar $\frac{a_1}{b_1} = \frac{a_2}{b_2} = ... = \frac{a_n}{b_n} = t$ bo‘lsa, u holda ixtiyoriy $k_1, k_2, ...k_n$ larda
$\frac{k_1a_1 + k_2a_2 + ... + k_na_n}{k_1b_1 + k_2b_2 + ...k_nb_n} = t$
$\frac{k_1b_1 + k_2b_2 + ...k_nb_n}{k_1a_1 + k_2a_2 + ... + k_na_n} = t$
$\frac{k_1a_1 + k_2a_2 + ... + k_na_n}{k_1b_1 + k_2b_2 + ...k_nb_n} = (t+1)^2$
$k_1\frac{a_1}{b_1} + k_2\frac{a_2}{b_2} + ... + k_n\frac{a_n}{b_n} = t$

№189.
Qiyinlik darajasi-2

Ushbu $x^2 - y^2 = c,$ va $x + y = c_2 z$ birinchi integral qaysi sistemani qanoatlantiradi?
$\frac{dx}{y} = \frac{dy}{x} = \frac{dz}{z}$
$\frac{dx}{2y - z} = \frac{dy}{y} = \frac{dz}{z}$

$\frac{dx}{z}=\frac{dy}{xz}=\frac{dz}{y}$
$\frac{dx}{x}=\frac{dy}{y}=\frac{dz}{xy+z}$

№190.
Qiyinlik darajasi-3

$y\frac{dz}{dx}-x\frac{dz}{dx}=0$ birinchi tartibli xususiy hosilali tenglamaning umumiy yechimini ko‘rsating
$z=\varphi\left(x^2+y^2\right)$
$z=\varphi\left(x\ \ +y\ \ \right)$
$z=\varphi\left(x^2-y^2\right)$
$z=\varphi\left(x\ \ +y^2\right)$