Practice Lesson_15_04_20

GROUP I-219ia, 219iбe,219iвe

1.8. Practice Lesson №3_№4. Integration of the linear equations and Integration of the Bernoulli's Equations

Classwork	**Answers**
Find the general solution of the equations:	
3.1. $y'+2y=4x.$	$y=Ce^{-2x}+2x-1.$
3.2. $y'+\frac{1-2x}{x^2}y=1.$	$y=Cx^2e^{\frac{1}{x}}+x^2.$
3.3. $y'+y=\cos x.$	$y=Ce^{-x}+\frac{1}{2}(\cos x+\sin x).$
3.4. $2ydx+(y^2-6x)dy=0.$	$y^2-2x=Cy^3.$
3.5. $y'=\frac{y}{2y\ln y+y-x}.$	$x=y\ln y+\frac{C}{y}.$
Solve the initial-value problem:	
3.6. $y'-y\tan x=\sec x,\ y(0)=0.$	$y=\frac{x}{\cos x}.$
3.7. $xy'-\frac{y}{x+1}=x,\ \ y(1)=0.$	$y=\frac{x}{x+1}(x-1+\ln\lvert x\rvert).$
Homework	**Answers**
Find the general solution of the equations:	
3.8. $y'+2xy=xe^{-x^2}.$	$y=e^{-x^2}\left(C+\frac{x^2}{2}\right).$
3.9. $(1+x^2)y'-2xy=(1+x^2)^2.$	$y=(x+C)(1+x^2).$
3.10. $y'=\frac{1}{2x-y^2}.$	$y=Ce^{2y}+\frac{1}{2}y^2+\frac{1}{2}y+\frac{1}{4}.$

3.11. $x(y'-y)=(1+x^2)e^x$.	$y=e^x\left(\ln\lvert x\rvert+\frac{x^2}{2}\right)+Ce^x$.
Solve the initial-value problem:	
3.12. $xy'+y-e^x=0,\quad y(a)=b$.	$y=\frac{e^x+ab-e^a}{x}$.
3.13. $t(1+t^2)dx=(x+xt^2-t^2)dt$, $x(1)=-\frac{\pi}{4}$.	$x=-t\arctan t$.
Additional Tasks	
3.14. Find the line if it is known that ordinate of any point of tangent line in two times less than abscissa of the tangency point.	$y=Cx-x\ln\lvert x\rvert-2$.

1.10. Practice Lesson №4. Integration of the Bernoulli's Equations

Classwork	**Answers**
Find the general solution of the equations:	
4.1. $y'+2xy=2x^3y^3$.	$\frac{1}{y^2}=Ce^{2x^2}+x^2+\frac{1}{2}$.
4.2. $y^{n-1}(ay'+y)=x$.	$ny^n=Ce^{\frac{-nx}{a}}+nx-a$.
4.3. $xy'+y=y^2\ln x$.	$y(1+\ln x+Cx)=1$.
4.4. $y'+\frac{2y}{x}=\frac{2\sqrt{y}}{\cos^2 x}$.	$y=\left(\frac{C+\ln\lvert\cos x\rvert}{x}+\tan x\right)^2$.
4.5. $ydy-\frac{ay^2}{x^2}dx=\frac{bdx}{x^2}$.	$y^2=Ce^{\frac{-2a}{x}}-\frac{b}{a}$.
Homework	**Answers**
Find the general solution of the equations:	

4.6. $y' + \frac{y}{x-1} + y^2 = 0$.	$y = \frac{1}{(1+x)(C + \ln\lvert 1+x\rvert)}$.
4.7. $xdx = \left(\frac{x^2}{y} - y^3\right)dy$.	$x^2 = y^2(C - y^2)$.
4.8. $y' - ytgx + y^2 \cos x = 0$.	$y(x + C) = \sec x$.
4.9. $xy' - 4y - x^2\sqrt{y} = 0$.	$y = \frac{x^4}{4}\ln^2\lvert Cx\rvert$.