LIST 1.
Differential equations 1st order.

Task 1: Solve the equations by separating the variables:

a) $y'-xy^2=2xy$; b) $y'=\sqrt{y}e^{3x}$; c) $(1+x^2)y'=2xy$;

d) $\sin y'=x$; e) $y'tgx-y=-2$; f) $y'+(1-y^2)tgx=0$.

Task 2: Solve the equations by a separating the variables using substitutions:

a) $y'=\cos(y-x)$; b) $y'-y=2x-3$; c) $y'=\sqrt{4x+2y-1}$.

Task 3: Find a solution of equations with separated variables satisfying the initial conditions:

a) $yy'+4x=0$, y(0)=4; b) $dy=2xy^2dx$, y(0)=1; c) $x(y^2-1)dx+y(x^2-1)dy=0$, y(0)=2.

Task 4: Solve linear differential equations:

a) $xy'-2y=2x^4$; b) $x(y'-y)=e^x$; c) $y=x(y'-x\cos x)$; d) $y'=\frac{y}{3x-y^2}$;

e) $xy'+(x+1)y=3x^2e^{-x}$; f) $(2x+1)y'=4x+2y$; g) $y'=2x(x^2+y)$.

Task 5: Find a solution of linear differential equations with satisfying the initial conditions:

a) $y'+\frac{3}{x}y=\frac{2}{x^3}$, y(1)=1; b) $xy'=x-y$, y(0)=0.

c) $y'-2xy=1$, y(0)=0; d) $xy'=x+2y$, y(0)=0