Задачи с экзамена.

Найти общее решение дифференциальных уравнений

1. $xy' = y + \cos^2 \frac{y}{x}$.
2. $xy' = y(1 - \ln x - \ln y)$.
3. $x(y' - \ln y') = 1$.
4. $\frac{y}{x}dx + (y^3 + \ln(x))dy = 0$.
5. $D^2x - 4Dx + 13x = 100te^t$.
6. $t^3D^3x - tDx - 3x = 0$.
7. $y' = \frac{y}{y^2 - x}$.
8. $y' \sin(y') = y$.
9. $\begin{cases} Dx = \frac{1}{y}, \\ Dy = -\frac{1}{x}. \end{cases}$
10. $t^3D^3x + tDx - x = 0$.
11. $y'^2 - 2xy' + y = 0$.
12. $(2x_3 - x_2)\frac{\partial u}{\partial x_1} + x_2\frac{\partial u}{\partial x_2} + x_3\frac{\partial u}{\partial x_3} = 0$.
13. $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 2y - x$.
14. $y' = \frac{y}{y^3 - x}$.
15. $xyy' = y^2 + \ln x$.
16. $yy'' = y'^3$.
17. $D^2x - 4Dx + 4x = \cos t$.
18. $yy'' + y'^2 = y'$.
19. $t^3D^3x - 6t^2D^2x + 6tDx - 6x = 0$.
20. $\begin{cases} Dx_1 = -x_2, \\ Dx_2 = \frac{(x_1 - x_2)}{t^2} \end{cases}$.
21. $x\frac{\partial u}{\partial x} + u\frac{\partial u}{\partial y} = 0$.
22. $D^2x + 4x = \frac{2}{\cos 2t}$.
23. $xy' = y - y^2 \ln x$.