

Solve the following differential equations. For 1, 3, 4, and 6, your answer should be in the form $y = f(x)$. For 2 and 5 you can leave the equation in another form since solving for y is probably impossible.

1. $\frac{dy}{dx} = \frac{y+1}{x}$

2. $x^2y^2dy = (y+1)dx$

3. $(e^{-y} + 1)\sin(x)dx = (1 + \cos(x))dy, y(0) = 0$

4. $x^2y' = y - yx, y(-1) = -1$

5. $(y - yx^2)\frac{dy}{dx} = (y+1)^2$

6. $x(x-2)y' + 2y = 0, y(3) = 6$