(1) Find a differential equation of the form \( \frac{dy}{dx} = G(y) \) so that \( y = \tan(x) \) is a solution.

(2) Apply the transformation \( u = xy \) to the differential equation
\[
\frac{dy}{dx} = \frac{e^{xy} - xy}{x^2}.
\]
Use this to solve the DE.

(3) Solve the IVP
\[
\frac{e^x}{y^2 + 1} dy - x dx = 0 \quad y(0) = 0.
\]

(4) Find the most general family of solutions to the differential equation
\[
x \frac{dy}{dx} - (1 + x)y = xy^2
\]

(5) Find an integrating factor of the form \( x^n y^m \) to the ODE
\[
(12 + 5xy)dx + (6xy^{-1} + 3x^2)dy = 0.
\]
Use this to find a family of solutions to the ODE.