1. [5pts] Find the explicit solution $y(x)$ for the (exact) initial value problem

$$
\left(\frac{1}{x+y^2} - x\right)dx + \frac{2y}{x+y^2}dy = 0, \quad y(0) = 1
$$

2. [5pts] Find the unique solution of the following linear initial value problem:

$$
y' + \frac{2}{x}y = 4x, \quad y(1) = 2
$$
3. [5pts] Find the general solution of the following homogeneous problem:

\[ \frac{dy}{dx} = \frac{x^2 + xy + y^2}{x^2} \]

4. [5pts] Find the general solution \( y(x) \) of the following Bernoulli equation:

\[ \frac{dy}{dx} + \frac{1}{2} y = y^3 \]