In a Year 13 class, students are asked to solve the following problem:

“It is given that \( y = -\frac{1}{x} \) is the a solution to the differential equation \( \frac{dy}{dx} = y^2 \).

Find the general solution to this differential equation.”

The conversation between Students A and B follows.

**Student A:** If \( y = -\frac{1}{x} \) is a solution, then \( y = -\frac{1}{x} + C \) should be the general solution, where \( C \) is a constant. It seems to me that the graphs of all these functions are vertical translations of the \( y = -\frac{1}{x} \) graph. Let me sketch these graphs in GeoGebra, I can make a slider for \( C \) and keep the trace of the graphs for the different values of \( C \), look:

**Student B:** Hold on, you say that \( y = -\frac{1}{x} + 1 \), for example, is a solution of the equation \( \frac{dy}{dx} = y^2 \). Let me check [he writes]: \( \frac{dy}{dx} = \frac{1}{x^2} \), but \( y^2 = \left(-\frac{1}{x} + 1\right)^2 \) is not \( \frac{1}{x^2} \).

What’s the problem here?

You are the teacher and you just heard this conversation.

**Questions:**

a. What is a solution to this mathematical problem?

b. What are the aims of using this problem in class?

c. What are the issues emerging from the exchange between Students A and B?

d. How would you respond to the two students and to the whole class?