Name: _____

You must show all your work to receive credit. Calculators are allowed.

Problem 1: (3 points) A is a 3×3 matrix and $\vec{v_1}, \vec{v_2}, \vec{v_3}$ are vectors such that

$$A\vec{v_1} = -\vec{v_1}, \quad A\vec{v_2} = 2\vec{v_2}, \quad A\vec{v_3} = -4\vec{v_3}.$$

Find the solution of the IVP

$$\begin{aligned} \vec{x}' &= A\vec{x}, \\ \vec{x}(0) &= 7\vec{v_1} + 8\vec{v_2} + 9\vec{v_3}. \end{aligned}$$