Exercise 1. Let $A \in \mathbb{R}^{2 \times 2}$ and let $\varphi$ be the flow associated to $A$. Prove that there exists a constant $C > 0$ such that, for any $(t, x) \in \mathbb{R} \times \mathbb{R}^2$, 

$$|\varphi(t, x)| \leq C|x|e^{C|t|}.$$ 

Hint: it is enough to prove this only for $t > 0$ (why?).