EE263 homework 5 additional exercise

1. *Scalar time-varying linear dynamical system.* Show that the solution of $\dot{x}(t) = a(t)x(t)$, where $x(t) \in \mathbf{R}$, is given by

$$x(t) = \exp\left(\int_0^t a(\tau)\, d\tau\right) x(0).$$

(You can just differentiate this expression, and show that it satisfies $\dot{x}(t) = a(t)x(t)$.) Find a specific example showing that the analogous formula does not hold when $x(t) \in \mathbf{R}^n$, with $n > 1$.