1. Road map of the module
2. Topology (in $\mathbb{R}$) true/false
   (a) A set S is closed iff it is not open
   (b) A finite set is always closed
   (c) All intersections of open sets are open
   (d) An open set that contains every rational number must contain all of $\mathbb{R}$
3. Prove that the intersection of two open sets in $\mathbb{R}^n$ is open (using the definitions of open sets in $\mathbb{R}^n$, not just general facts about open sets)
4. Prove that a singleton set (set of one element) in $\mathbb{R}^n$ is closed
5. Using integration, solve the differential equation (of one variable) $\dot{x} = kx$. How does this relate to the technique we used this week for solving (some) differential equations of multiple variables?
6. Using the Taylor-series definition, prove that if D is a diagonal matrix, then the exponentiation rule we learned back in Module 1 works.
7. If time: Suppose that $\dot{\vec{v}} = A\vec{v}$, where $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$, and that $v_0 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$. Given this, solve for $\vec{v}$. Notice that there is only one eigenvalue, so there is no basis of eigenvectors.