1. Axler 5.A 3

2. Axler 5.A 8

3. Axler 5.B 3

4. Axler 5.C 16

5. `removed`

6. Let V be the real vector space of power series with real coefficients:

$$a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \cdots , \ a_i \in \mathbb{R}$$

   Note that any two power series can be added together and can be multiplied by elements of $\mathbb{R}$, so power series do indeed form a real vector space.

   Consider the linear map
   $$T : V \to V$$
   $$u \mapsto \frac{d^2 u}{dx^2}$$

   For each $\lambda \in \mathbb{R}$, find compute the dimension of the λ-eigenspace of T. Find a basis for each eigenspace. How does this relate to the functions $\sin$ and $\cos$?