EXERCISE 1
Let $A$ be a ring. Discuss the construction of the ring $A[X]$ of \textit{formal power series} and characterize its invertible elements. Describe $\text{Spec}(k[X])$ for a field $k$.

EXERCISE 2
Let $X$ be a compact Hausdorff space and denote
\[ C(X, \mathbb{R}) := \{ f : X \to \mathbb{R} \mid f \text{ is continuous} \}. \]
This is a ring by adding and multiplying value-wise. Consider the map
\[ \mu : X \to \text{mSpec}(C(X, \mathbb{R})) \quad x \mapsto m_x := \{ f \in C(X, \mathbb{R}) \mid f(x) = 0 \}. \]
and show that this is a homeomorphism where $\text{mSpec}(C(X, \mathbb{R}))$ carries the subspace topology of the Zariski topology on $\text{Spec}(C(X, \mathbb{R}))$.

EXERCISE 3
Find the radical ideal of $(X^3Y^2)$.

EXERCISE 4
Find the irreducible components of $V((X^3 - YZ)^2, (XZ - Y^2)^3) \subseteq \mathbb{A}^3_{\mathbb{C}}$. 