A feedforward artificial neural network is a (low bias, high variance) method of supervised learning, where the class of potential functions being fit to the data is described by a directed, k-partite graph and an activation function (like $x_+$, called ReLU, or $\frac{1}{1+e^{-x}}$, called sigmoid). Practitioners in machine learning often make adjustments to the topology of this graph in order to improve the learning task; however, there is very little intuition behind these adjustments. In this work, we describe the meaning of these topological adjustments when the activation function is chosen to be polynomial—something not typically done as such a system cannot well-approximate functions in $C^1(K)$ for some compact set $K \subset \mathbb{R}^\times$ when allowing for arbitrarily large independent sets in the k-partite graph, called layers. Here, we demonstrate not only the meaning of the underlying topologies, but the ability of such a network to learn various algebraic varieties and gauge the potential for other applications. (Received July 17, 2019)