A new enumerator polynomial with a smart derivative

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Let S_n be a given set of n-vertex simplicial complexes; e.g., a set of n-vertex paths, cycles, trees, or 2-cell embeddings of graphs, etc. We solve the problem of determining the cardinality $|S_n|$ in a double sense: (1) the labeled sense; all n vertices are mapped bijectively onto the set of labels $\{1, 2, \ldots, n\}$ where different maps (labelings) may produce different complexes, (2) the unlabeled sense, that is, up to isomorphism (labels removed). A new enumerator polynomial, $P_n(x)$, will be introduced. It has interesting properties: The value $P_n(1)$ is equal to $|S_n|$ in the labeled sense while the value of the derivative $P'_n(1)$ is equal to $n!$ times $|S_n|$ in the unlabeled sense. For example, for paths with n vertices $P_n(x) = (n!/2)x^2$. More examples and properties of the enumerator polynomial will be presented.