The authors use PARI and MAPLE to find the most basic nontrivial polynomials $g(y)$ and $h(z)$ over $\mathbb{C}$ for which $g(y) - h(z)$ is factorable. To exclude trivial examples, $g$ and $h$ are to be nondecomposable, and furthermore not linearly related ($h(z) \neq Ag(ax + b)$) to exclude Chebyshev polynomials. The factors arising from $g(y) - h(z) = A(y,z)B(y,z)$ link the Galois (monodromy) groups of $g(y) = \text{const}$ with $h(z) = \text{const}$ in such a way that block design considerations limit the polynomials to (common) degree $n \in \{7, 11, 13, 15, 21, 31\}$. The cases are listed and have the form $g(x) \in K[x,T]$ with $K$ an imaginary number field and $T$ a parameter. Then $h(x) = g^*(x)$, (referring to the complex conjugate imbedding of $K$) when $n \neq 15$ and $h(x) = -g^*(x)$ for $n = 15$.


Reviewer: Harvey Cohn (Bowie)