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Chad Awtrey* (cawtreysamford.edu). *Power compositional sextic polynomials and their Galois groups.*

Let F be a field of characteristic not equal to 2 or 3, and let $f(x) = x^2 + ax + b$ and $g(x) = x^3 + ax^2 + bx + c$ for $a, b, c \in F$. In their 1989 Monthly paper, Kappe-Warren give an efficient method for computing the Galois group of the irreducible polynomial $f(x^2)$. We describe analogous algorithms for determining the Galois groups of $f(x^3)$ and $g(x^2)$; such polynomials are sometimes called *power compositional* sextic polynomials. These methods generalize previous results on Galois groups of power compositional sextics, and we demonstrate how they are useful for producing one-parameter families of polynomials with a specified Galois group. Relatedly, if L/F is any sextic extension, we give necessary and sufficient conditions for L to be defined by irreducible power compositional polynomials $f(x^3)$ and/or $g(x^2)$. Further, we describe how to construct sample polynomials f and g explicitly, when they exist; we use Kummer theory to help with the $g(x^2)$ case and a recent result of Kang for the $f(x^3)$ case. (Received August 03, 2021)