In this talk, we consider the complement \( NR(G) \) of a numerical semigroup generated by a compound sequence \( G \). By generalizing a result of Tuenter, we are able to compute sums of powers of elements in \( NR(G) \), also known as Sylvester sums. As an application, we compute the weights of higher-order Weierstrass points on suitable towers of complex algebraic curves. (Received September 26, 2017)