We consider a general class of Fourier coefficients for an automorphic form on a finite cover of a reductive adelic group $G(A_K)$, associated to the data of a `Whittaker pair'. We describe a quasi-order on Fourier coefficients, and an algorithm that gives an explicit formula for any coefficient in terms of integrals and sums involving higher coefficients. The maximal elements for the quasi-order are 'Levi-distinguished' Fourier coefficients, which correspond to taking the constant term along the unipotent radical of a parabolic subgroup, and then further taking a Fourier coefficient with respect to a K-distinguished nilpotent orbit in the Levi quotient. Thus one can express any Fourier coefficient, including the form itself, in terms of higher Levi-distinguished coefficients. In follow-up papers we use this result to determine explicit Fourier expansions of minimal and next-to-minimal automorphic forms on split simply-laced reductive groups, and to obtain Euler product decompositions of their top Fourier coefficients. This is joint work with Dmitry Gourevitch, Henrik P. A. Gustafsson, Axel Kleinschmidt, and Daniel Persson https://arxiv.org/abs/1811.05966