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The boundary conditions given to symmetric Sturm-Liouville differential operators that make them self-adjoint can be written as rank-one perturbations. Perturbation theory allows a completely description of the spectrum of these self-adjoint operators as the boundary conditions range over all possible combinations. This description is much more efficient than existing strategies in Sturm-Liouville theory. In particular, explicit forms for eigenfunctions are given for each such set of boundary conditions. (Received September 20, 2017)