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Nicholas A. Loehr* (nloehr@vt.edu), 460 McBryde Hall, Blacksburg, VA 24061-0123, and
Gregory S. Warrington and **Drew Armstrong**. *Sweep maps and generalized q, t -Catalan numbers*.

We define a family of maps on lattice paths, called *sweep maps*, that assign levels to each step in the path and sort steps according to their level. Surprisingly, although sweep maps act by sorting, they appear to be bijective. We explain how inversion of the sweep map (which is an open problem in general) can be solved in known special cases by finding a *bounce path* for the lattice paths under consideration. The sweep maps lead to concise combinatorial formulas for the q, t -Catalan numbers, the higher q, t -Catalan numbers, the q, t -square numbers, and many more general polynomials connected to the nabla operator and rational Catalan combinatorics. Many algorithms that have appeared in the q, t -Catalan literature are all special cases of the sweep maps or their inverses. The sweep maps provide a simple unifying framework for understanding all of these algorithms. (Received August 15, 2014)