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Norton Starr* (nstarr@amherst.edu), Dept. of Math. and Comp. Sci., Amherst College,
Amherst, MA 01002. *Some Examples of Induction in Combinatorial Geometry.*

We present two examples of induction, one an ordinary induction, the other a strong induction. Both are geometric and lend themselves well to classroom demonstration. In 1954, Solomon Golomb showed how to tile square arrays with trominoes, provided the side length is a power of two and one cell is forbidden. This recursive argument is well illustrated by models. One can make them, or use any of several interactive internet sites, or purchase an 8×8 version from Kadon Enterprises. A 3 dim. analog of the array illustrates the strong induction, though with more difficulty. In 3 dim's a tromino consists of 3 cubes, with 2 meeting the third on adjacent faces. A cube of side length k is singly deficient if one of its k^3 cells is occupied, and doubly deficient if two are occupied. It can be shown that for each positive integer n , any singly deficient cube of side length 2^n can be tiled by trominoes if n is even, and any doubly deficient cube of side length 2^n can be tiled by trominoes if n is odd. When n is odd, the induction is complicated by the extra degree of freedom inherent in the arbitrary placement of a second single cube. The 3 dimensional result can be strengthened to the tiling of cubes of any side length k , having the appropriate deficiencies. (Received June 26, 2007)