

1035-R1-985

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Checkerboard Tiling and Mathematical Induction. Preliminary report.

The following tiling puzzle using a checkerboard can be used to strengthen pattern-based conjectures, and to illustrate the difference between weak and strong mathematical induction. Consider a standard checkerboard; remove any one square and show that the remaining board can be tiled using L-shaped trominos. Using weak mathematical induction, this result can be generalized to any 2^n by 2^n size checkerboard. Taking the puzzle one step further, the need for strong mathematical induction can be highlighted as the result is generalized to other sizes of checkerboards. Examples will be provided from student groups who have worked on the strong mathematical induction portion of this problem and presented results at undergraduate research conferences. (Received September 18, 2007)