

Problems

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Problem 1: Suppose that one removes two opposite corner squares of a checkerboard. Can the remaining 62 squares be covered with 31 dominos of size 2×1 ?

Problem 2: Show that

$$\sum_{k=1}^n \frac{1}{k}$$

is never an integer for $n \geq 2$.

Problem 3: Two points A and B lie on one side of a line L . Show how to construct the shortest path, consisting of line segments joined at their ends, from A to B which touches L .

Problem 4: If m and n are positive integers with m odd, determine the value of

$$d = \text{GCD}(2^m - 1, 2^n + 1).$$