

Fundamentals of Mathematics

Homework Set 1

Spring, 2008

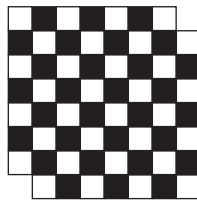
<http://staffweb.ncnu.edu.tw/shieng>

Due date: March 3

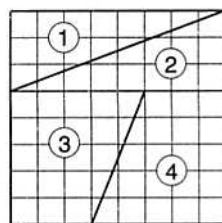
Problem 1 Show that there do not exist natural numbers m and n such that $\frac{7}{17} = \frac{1}{m} + \frac{1}{n}$.

Problem 2 Show that $n^2 - n + 41$ is not always prime for all integers $n \geq 0$.

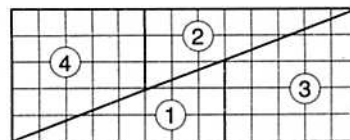
Problem 3 Consider an 8×8 -chessboard whose two diagonally opposite corners are removed (as shown in the following figure). Is it possible to place 31 dominoes with size 1×2 ($\square\square$ or $\begin{smallmatrix} \square \\ \square \end{smallmatrix}$) to cover all of the squares?



Problem 4 Cut a chessboard into four pieces and then assemble them into a 5×13 -rectangle. There are $8 \times 8 = 64$ squares in the chessboard, but there are totally $5 \times 13 = 65$ squares in the rectangle. Hence we conclude $64 = 65$. Is this derivation correct?



$$8 \cdot 8 = 64$$



$$5 \cdot 13 = 65$$