TOPIC 4: The Induction Principle (Homework Problems):

Homework Problems:

1) Show that all numbers of the form 12008, 120308, 1203308, 12033308, … are divisible by 19.

2) A sequence a_n is given by $a_1=a_2=1$ and $a_n = (a_{n-1}^2 + 2)/a_{n-2}$ for $n \geq 3$. Show all terms of the sequence are integers.

3) (BWM 82.1.3)
A quadratic board with sides 2^n is divided into unit squares. One of these unit squares is removed. Prove that the remaining incomplete board can be tiled with L-shaped tiles (consisting of 3 unit squares):

4) (AUMO 1971, BWM 1972.2.4):
Prove that for any positive integer n there exists a positive integer which is divisible by 2^n and whose decimal representation consists of n digits all of which are digits 1's or 2's.