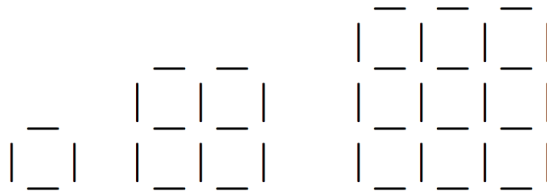


Homework Assignment no. 3

Date: Due Jan 16, 2012

Your assignment should include complete sentences and explanations and not just a few equations, tables or numbers. A solution will not receive full credit unless you explain what your answer represents and where it came from. You may discuss the homework with other students in the class, but please write your own solutions.

- (1) The statements below are all true, provide a proof of why they are true.
 - (a) Assume a, b, c are all integers, if ab, ac, bc are all odd, then a, b, c are odd.
 - (b) For integers a and b , $a - b$ is odd if and only if $a + b$ is odd.
 - (c) If y is an integer, then $y^3/3 + y^2 - 10y/3 + 2$ is an integer.
 - (d) The sum of the squares of two odd integers cannot be a perfect square.
 - (e) If x and y are positive real numbers, then $\sqrt{x+y} \neq \sqrt{x} + \sqrt{y}$.
 - (f) The product of a rational number and an integer is a rational number.
- (2) Say that you are using matchsticks to make squares such that the matches can lie next to each other but may not overlap. How many matches are required to make $N \times N$ unit squares in a square array as in the following sequence?



How does this generalize to an $N \times M$ rectangle?