01:XXX:XXX - Homework n

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1 Problems

Example (3 Coloring of NxN)**.** what is the number of all 3 colorings of an NxN grid such that no two adjacent cells have the same color? LB = $\sqrt{2}^{n^2}$
UB = $3 * 2^{n^2}$

$$N(n) \sim \frac{4}{3}^{\frac{3}{2}^{n^2}}$$

this number is the squareice constant
Ice Problem Elliot Lieb

Example (Domino Tilings of NxN)**.** what is the number of ways to tile an NxN grid with 2x1 dominoes? Not possible if N is odd
Im thinking LB is $(\frac{N}{2})^2$
UB is $N!$

$$N(n) \sim$$

For $N(8) = 12988816$
We know for N even it exists

Example (Magic Square)**.** MS for n=2 does not exist

Proof. Let the square be

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

then we have $a + b = c + d$ and $a + c = b + d$ and $a + d = b + c$
then $a = d$ and $b = c$ and $a = b = c = d$
so all numbers are equal which is not possible since we want distinct positive integers. □