Complex Problems

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The puzzles are marked with stars (★) that show the degree of difficulty of the given puzzle.

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Eight Queens ★★½

This is a commonly known chess problem.

The Question: In how many ways can you arrange eight queens on a standard chessboard in such a way that none of them is attacking any other?

The Answer: *Click here!...*

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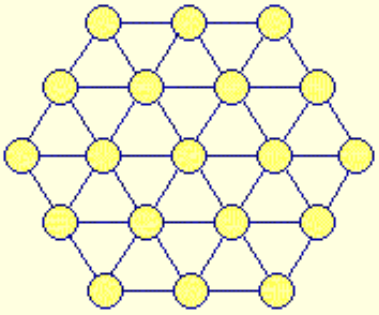
Nineteen Numbers Net ★★½

This number net has nineteen circles that have to be filled with the numbers 1 up to (and including) 19. These numbers have to be placed in such a way that all numbers on any horizontal row and any diagonal line add up to the same sum.



Warning: there are many horizontal and diagonal lines, which have a different number of circles (3, 4, or 5), nevertheless all these sums have to be equal!

The Question: How should the nineteen numbers be placed in the net?

The Answer: ***Click here!...***

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Cash for a Car ☆☆☆

Thanks to Lucas Jones, we can present you the following puzzle:

A man is going to an Antique Car auction. All purchases must be paid for in cash. He goes to the bank and draws out $25,000.

Since the man does not want to be seen carrying that much money, he places it in 15 envelopes numbered 1 through 15, in such a way that he can pay any amount up to $25,000 without having to open any envelope. Each envelope contains the *least* number of bills possible of any available US currency (for example, no two tens instead of a twenty).

At the auction, he makes a successful bid of $8322 for a car. He hands the auctioneer envelopes 2, 8, and 14. After opening the envelopes, the auctioneer finds exactly the right amount.

The Question: How many ones did the auctioneer find in the envelopes?

The Answer: ***Click here!...***

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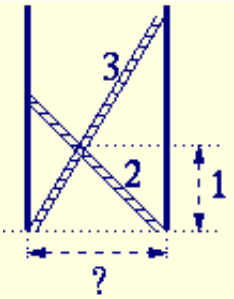
Ladder Alley ☆☆☆

In an alley, two ladders are placed crosswise. The lengths of these ladders are resp. 2 and 3 meters. They cross one another at one meter above the ground.



The Question: What is the width of the alley**?**

The Answer: ***Click here!...***

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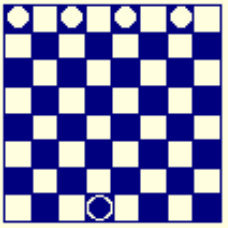
Cat & Mouse ★★★★



Four white pieces (the mice) are placed on one side of a chessboard, and one black piece (the cat) is placed at the opposite side. The game is played by the following rules:

- black wins if it reaches the opposite side;
- white wins if it blocks black in such a way that black cannot make any move anymore;
- only diagonal moves (of length 1) on empty squares are allowed;
- white only moves forward;
- black can move backward **and** forward;
- black may make the first move, then white makes a move, and so on.

The Question: Is this game computable (i.e. is it possible to decide beforehand who wins the game, no matter how hard his opponent tries to avoid this)**?**

The Answer: ***Click here!...***

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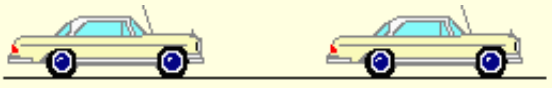
Car Parking ★★★★



A street of length ***L*** is randomly filled with cars (one by one), where the length of a car is the unity of ***L*** (i.e. **1**).

The Question: What is the expectation for the number of cars that can be parked until the street is filled**?**

The Answer: ***Click here!...***

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