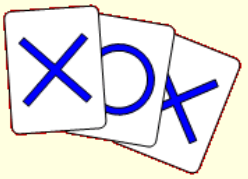
Brainteasers

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

back to the main page Add this site to your bookmarks or favorites!

Cards with Crosses ★★



You have a stack of 23 cards. Each card has an image of a cross on one side and an image of a circle on the other side. You know that 14 cards in the stack are lying with the cross up, and therefore 9 cards are with the circle up. However, you do not know in which order the cards are. Moreover, you are in a completely dark room, so you cannot see anything.

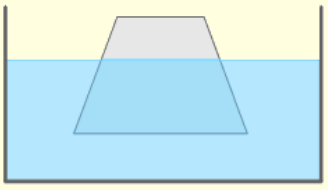
The Question: How can you, without seeing anything, divide the stack of cards in two smaller stacks, in such a way that both stacks have the same number of cards with a cross up?

A Hint : ***Click here!...***

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

back to the index

Eureka! ★★★



There is a story that Archimedes, the Greek mathematician, was asked to find out if the new golden crown of the king was made of pure gold, while keeping the crown intact. Sitting in a public bath and thinking about it, Archimedes noticed the displacement of the water caused by sinking his body lower into the water. He suddenly realized that he had found the solution: if the crown was made of pure gold, it should displace the same volume of water as a bar of pure gold with an equal weight. Excited, he jumped out of the bath and ran home shouting "Eureka!" ("I've found it!"), forgetting that he was still naked...

We do not know if the story is true. However, we do know that Archimedes discovered the first law of hydrostatics: *when a body is immersed in a fluid, it experiences an upward buoyant force, which is equal to the weight of the fluid displaced by the immersed part of the body.*

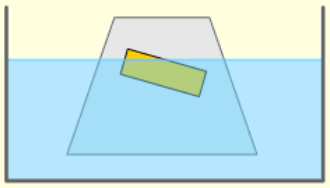
Can you solve the following questions and have your "Eureka!" moments, using this famous law?

In an aquarium filled with water, a block of ice floats. We mark the current water level.

The Question: When the ice has molten completely, will the water level be higher, lower, or still the same?

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

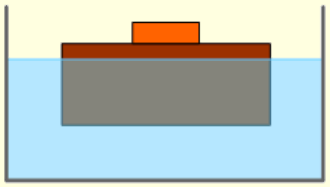
Another Question: In an aquarium filled with water, a block of ice block floats, with a bar of gold frozen in it. We mark the current water level. When the ice has molten completely and the bar of gold has sunk to the bottom of the aquarium, will the water level be higher, lower, or still the same?



A Hint : *Click here!...*

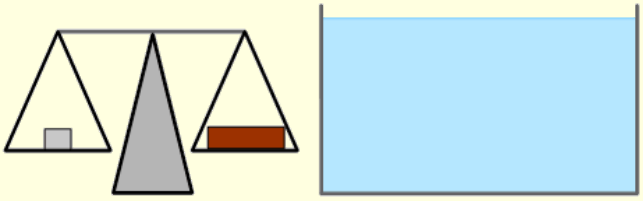
Another Answer: *Click here!...*

Yet Another Question: In an aquarium filled with water, a block of wood floats. On top of the block of wood, a brick has been glued. We mark the current water level. If the block of wood is turned around (so that the brick hangs under it), will the water level rise, fall, or stay the same?



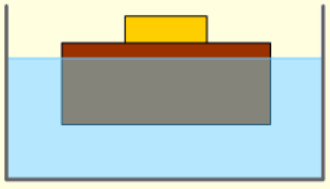
Yet Another Answer: *Click here!...*

The Fourth Question: We have a pair of scales, with a block of lead on the left scale, and a block of wood on the right scale. Both blocks have the same weight, so the scales are in balance. We take the scales with the blocks and immerse them in an aquarium filled with water. Will the scales stay in balance, will they turn left, or will they turn right?



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

The Fifth Question: In an aquarium filled with water, a block of wood floats. On top of the block of wood, there lies a bar of gold. We mark the current water level. If the bar of gold falls into the water and sinks to the bottom of the aquarium, will the water level rise, fall, or stay the same?



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

The Sixth Question: In an aquarium filled with water, a sponge floats. While the sponge slowly absorbs water (but stays floating), will the water level rise, fall, or stay the same?

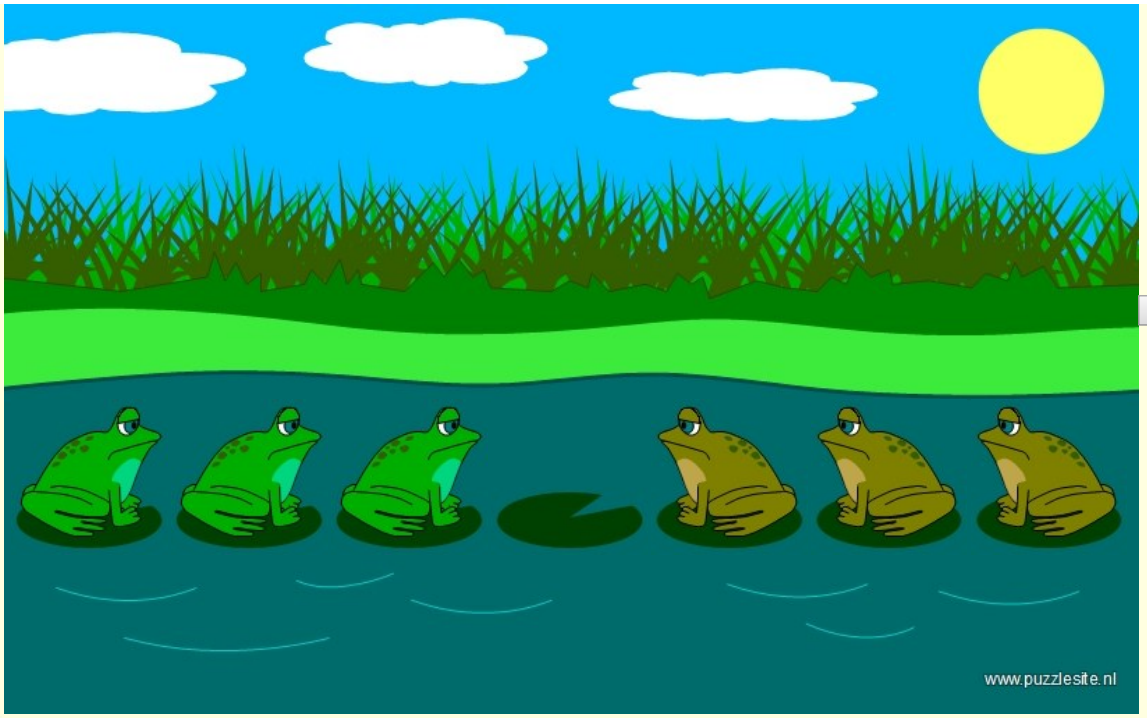
The Sixth Answer: *Click here!...*

back to the index

Freaky Frogs

Here you see a pool with six happy frogs. You must exchange the positions of the brown and green frogs, using the following rules:

- a frog can only jump to an empty water lily;
- a frog can only jump over at most one other frog, that has another color;
- a frog can only jump forward (so the green frogs jump right and the brown frogs jump left).



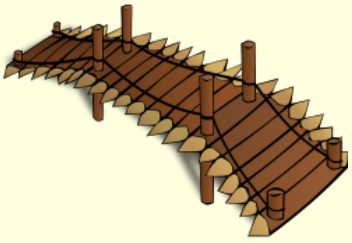
The Question: How can this be done?

A Hint : Click on a frog to let it jump.

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

back to the index

The Bridge ☆☆☆



Four men want to cross a bridge. They all begin on the same side. It is night and they have only one flashlight with them. At most two men can cross the bridge at a time and any party who crosses, either one or two people, must have the flashlight with them. The flashlight must be walked back and forth: it cannot be thrown, etc. Each man walks at a different speed. A pair must walk together at the speed of the slower man. Man 1 needs 1 minute to cross the bridge, man 2 needs 2 minutes, man 3 needs 5 minutes, and man 4 needs 10 minutes. For example, if man 1 and man 3 walk across together, they need 5 minutes.

The Question: How can all four men cross the bridge in 17 minutes?

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

back to the index

Alphabet Blocks ☆☆☆

Molly has a set of four alphabet blocks. Each side of these blocks is printed with a different letter, making 24 in total. Molly notices that by rearranging the blocks, she can spell each of the following words:

BOXY, BUCK, CHAW, DIGS, EXAM, FLIT,
GIRL, JUMP, OGRE, OKAY, PAWN, ZEST

The Question: Which letters are on each block?

The Answer: *Click here!...*

back to the index

Table for Two ☆☆☆☆

You are sitting with one opponent at an empty, round table. Taking turns, you should place one euro on the table, in such a way that it touches none of the coins that are already on the table. The first player that is not able to place a euro on the table has lost. By tossing a coin, it has been decided that you may start.

The Question: Which strategy will you follow to make sure you are guaranteed to win?

The Answer: *Click here!...*

back to the index

To Know or not To Know ☆☆☆☆

Two whole numbers, m and n, have been chosen. Both are greater than 1 and the sum of them is less than 100. The product, $m \times n$, is given to mathematician X. The sum, $m + n$, is given to mathematician Y. Then both mathematicians have the following conversation:

X: "I have no idea what your sum is, Y."
Y: "That's no news to me, X. I already knew you didn't know that."
X: "Aha! Now I know what your sum must be, Y!"
Y: "And now I also know what your product is, X!"

The Question: What are the numbers m and n?

The Answer: *Click here!...*

Another Question: Thanks to Yiheng Wang, we can present you the following puzzle:

There is a professor with three of her equally highly intelligent students (Amy, Brad, and Charles) and they are playing a puzzle game. The professor puts a piece of paper on each student's forehead, and on each piece of paper, there is a positive integer number. Each student can see the numbers on the other two students' foreheads, but not the one on him/herself. The professor tells the students: out of these three positive integer numbers, one number equals to the sum of the other two.

The students cannot speak until the professor starts to ask question and the three students answer in order.
Professor: "Do you know the number on your forehead (for sure, no guessing)?"
Amy: "I don't know."
Brad: "I don't know."
Charles: "I don't know."

Then the professor starts the second round of questioning.
Professor: "Do you know the number on your forehead (for sure, no guessing)?"
Amy: "I don't know."
Brad: "I don't know."
Charles: "Yes. It's 144."

Question to you, the reader: what are the three numbers?

Another Answer: *Click here!...*

back to the index

AQuiz ☆☆☆☆

1 2 3

You are a participant in a quiz. The quizmaster shows you three closed doors. He tells you that behind one of these doors, there is a prize, and behind the other two doors, there is nothing. You select one of the doors, but before you open it, the quizmaster deliberately picks out a remaining empty door and shows that there is nothing behind it. The quizmaster offers you a chance to switch doors with the remaining closed door.

The Question: Should you stick to your choice?

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

back to the index

John & Julia ☆☆☆☆

Julia is as old as John will be when Julia is twice as old as John was when Julia's age was half the sum of their present ages.

John is as old as Julia was when John was half the age he will be 10 years from now.

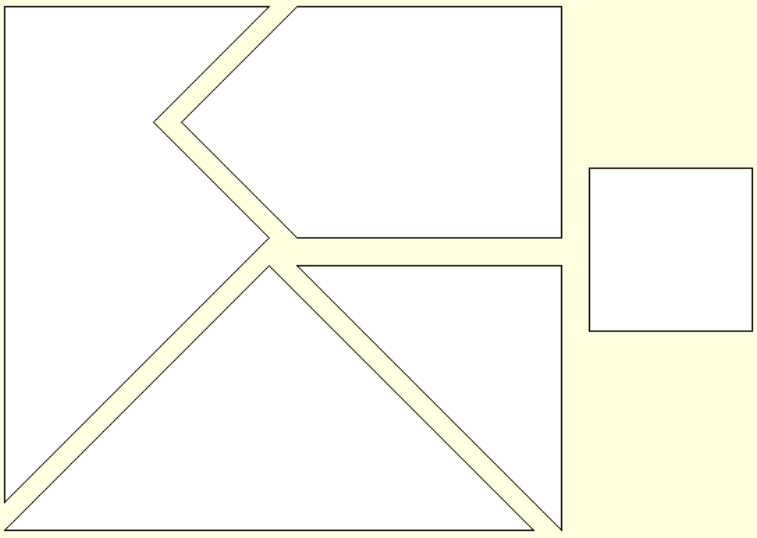
The Question: How old are John and Julia?

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

back to the index

Square Puzzle ☆☆☆☆

The five pieces shown below must be put together to a square.



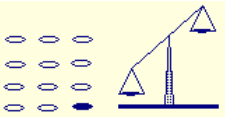
The Question: How should this be done?

A Hint : Print the picture with the pieces, and cut the pieces out. It is more difficult than it looks!

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

back to the index

Coin Weighing ☆☆☆☆



We have 12 coins and a balance. 11 coins are of the same weight, but one coin differs in weight (note that you **do not know** whether the coin with different weight is heavier or lighter!). You may perform three weighings to find out which coin has a different weight, and whether this coin is heavier or lighter.

The Question: How should you perform these three weighings to find out which coin has a different weight, and whether this coin is heavier or lighter**?**

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

back to the index

The Masters Plaza ☆☆☆☆

Thanks to Hassan Issa from Lebanon, we can present you the following puzzle:

You have the chance to take your room in the "Masters Plaza", a hotel in which five masters (five of the most intelligent people who ever lived) are present. The hotel consists of five rooms and a small restaurant that contains five tables. Each master has a rank, which shows his level of thinking with respect to the whole group. The master with the first rank is said to be the head master, and he is not you. Rooms, as well as tables, are successively numbered from 1 to 5 in a way that each master lives in a room and eats on a table different in number from his rank. To avoid confrontation, masters with successive ranks are allowed neither to live in rooms next to each other nor to eat on tables next to each other. The four present masters are Albert Einstein, Galileo Galilei, Hassan Issa, and Archimedes. To have your room in the Plaza, you just have to know your rank, table number and room number knowing that:

- Archimedes does not eat on the fifth table.
- Einstein is not the head master.
- Archimedes has exactly the middle rank between Hassan and you.
- Einstein is more intelligent than Archimedes is.
- Galileo eats on a table next to that of Einstein.
- Hassan does not eat on a table with the same number as his room number.

The Question: What are the ranks, room numbers, and table numbers of the five masters**?**

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

back to the index

Stacking Coins ☆☆☆☆

You have an unlimited number of coins with a diameter *d* and you stack them. The goal is to let the topmost coin stick out as far as possible.

The Question: What is the maximal distance between the center of the topmost coin and the center of the lowermost coin**?**

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

back to the index

3 Heads & 5 Hats ☆☆☆☆

In a small village in the middle of nowhere, three innocent prisoners are sitting in a jail. One day, the cruel jailer takes them out and places them in a line on three chairs, in such a way that man *C* can see both man *A* and man *B*, man *B* can see only man *A*, and man *A* can see none of the other men. The jailer shows them 5 hats, 2 of which are black and 3 of which are white. After this, he blindfolds the men, places one hat on each of their heads, and removes the blindfolds again. The jailer tells his three prisoners that if one of them is able to determine the color of his hat within one minute, all of them are released. Otherwise, they will all be executed. None of the

prisoners can see his hat, and all are intelligent. After 59 seconds, man *A* shouts out the (correct) color of his hat!

The Question: What is the color of man *A*'s hat, and how does he know?

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

back to the index

Zebra

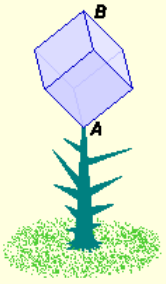
There are five adjacent houses. Each house has a unique color, and each owner has a different nationality. Each owner keeps a different pet, drinks a different type of beverage, and has a different occupation. The Brit lives in the red house, the Swede keeps a dog, and the Dane drinks tea. The green house is on the immediate left of the white house. In the green house, they drink coffee. The postman has birds. The fireman lives in the yellow house. In the middle house, they drink milk. The Norwegian lives in the leftmost house. The baker lives in the house next to the house with the cats. The fireman lives in the house next to the house with the horse. The bus driver drinks lemonade. The German is plumber. The Norwegian lives next to the blue house. They drink water in the house that lies next to the house where the baker lives. One of the owners keeps a zebra.

The Question: Who owns the zebra?

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

back to the index

Cube Creatures



On the planet Gnirica grows the peculiar cube plant (*cubus vulgaris gniricae*); see the image on the right. On the perfect cubical flower of this plant, the cube creature (*ambulator cubi gniricae*) lives. This creature is born at the bottom of the flower (point *A*), and his whole life it walks along the sides of the cubical flower. The cube creature walks one whole side in one year, and if it arrives in a vertex, it chooses a new direction (it can also decide to walk back along the same side it came from). As soon as the cube creature arrives at the top of the cubical flower (point *B*), it dies. Consequently, cube creatures live at least three years.

The Question: What age do cube creatures reach *on average*?

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

back to the index

Colorful Dwarfs

In a distant, dark forest, lives a population of 400 highly intelligent dwarfs. The dwarfs all look exactly alike, but only differ in the fact that they are wearing either a red *or* a blue hat. There are 250 dwarfs with a red hat and 150 dwarfs with a blue hat. Striking however, is that the dwarfs do not know these numbers themselves and that none of them knows what the color of his hat is (there are for example no mirrors in this forest). Nevertheless, dwarfs do know that there is at least one dwarf with a red hat.

During a certain period of their year, there is a big party in this village, to which initially all dwarfs will go. However, this party is only intended for dwarfs wearing a blue hat. Dwarfs with a red hat are supposed not to return to the party the next day, as soon as they know that they are wearing a red hat.

The Question: How many days does it take before there are no more dwarfs with a red hat left at the party?

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

back to the index

Pirate Treasure

A pirate ship captures a treasure of 1000 golden coins. The treasure has to be split among the five pirates: 1, 2, 3, 4, and 5 in order of rank. The pirates have the following important characteristics:

- Infinitely smart.
- Bloodthirsty.
- Greedy.

Starting with pirate 5, they can make a proposal how to split up the treasure. This proposal can either be accepted or the pirate is thrown overboard. A proposal is accepted if and only if a majority of the pirates agrees on it.

The Question: What proposal should pirate 5 make**?**

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

back to the index

Bizarre Boxes

Someone shows you two boxes and he tells you that one of these boxes contains two times as much as the other one, but he does **not** tell you which one this is. He lets you choose one of these boxes, and opens it. It turns out to be filled with $10. Now he gives you the opportunity to choose the other box instead of the current one (and skip the $10 of the first box), because the second box could contain twice as much (i.e. $20).

The Question: Should you choose the second box, or should you stick to your first choice to maximize the expected amount of money**?**

A Hint : If you have $10, and you could double this with a chance of 1/2, or half it with a chance of 1/2, one would expect an average of 1/2 * $20 + 1/2 * $5 = $12.5 (so you would expect to gain $2.5)**!**

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

back to the index

The Truel

On an early morning, three rivals get together on an open spot in a dark wood to compose a quarrel by means of guns. A kind of duel, but with three persons: A, B, and C. The rules of the game are:

- they draw lots who may fire first, second and third;
- next, they will continue firing at each other in this order until only a single person is alive;
- every person decides himself at which person he fires;
- everyone knows that A hits (kills) in 100% of all shots, B hits (kills) in 80% of all shots and C hits (kills) in 50% of all shots;
- each person chooses his ideal strategy;
- no one is killed by a stray bullet.

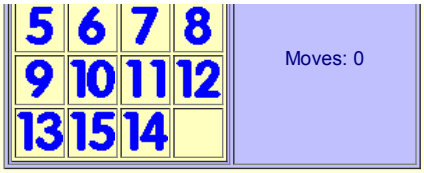
The Question: Who has the largest chance of surviving the truel, and how big is this chance**?**

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

back to the index

Fourteen Fifteen

Below you see a square with fifteen numbered, movable tiles and an empty space in the lower right corner. The tiles are placed in the correct order, except for the tiles numbered "14" and "15", which have been swapped.



The Question: How must the tiles be moved, to get all tiles in the correct order, with the empty space again in the *lower right corner*?

A Hint : Clicking the mouse on a tile next to the empty space moves the tile into the empty space. By clicking the mouse on a tile in the same row or column as the empty space, you can move several tiles in one move.

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

Another Question: Starting from the begin position, how must the tiles be moved, to get all tiles in the correct order, but with the empty space in the *upper left corner* (see below)**?**

	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

Another Answer: ***Click here!...***

back to the index

Coconut Chaos ☆☆☆☆☆

Five sailors survive a shipwreck and swim to a tiny island where there is nothing but a coconut tree and a monkey. The sailors gather all the coconuts and put them in a big pile under the tree. Exhausted, they agree to go to wait until the next morning to divide the coconuts.

At one o'clock in the morning, the first sailor wakes up. He realizes that he cannot trust the others, and decides to take his share now. He divides the coconuts into five equal piles, but there is one coconut left over. He gives that coconut to the monkey, hides his coconuts (one of the five piles), and puts the rest of the coconuts (the other four piles) back under the tree.

At two o'clock, the second sailor wakes up. Not realizing that the first sailor has already taken his share, he too divides the coconuts up into five piles, leaving one coconut over which he gives to the monkey. He then hides his share (one of the five piles), and puts the remainder (the other four piles) back under the tree.

At three, four, and five o'clock in the morning, the third, fourth, and fifth sailors each wake up and carry out the same actions.

In the morning, all the sailors wake up, and try to look innocent. No one makes a remark about the diminished pile of coconuts, and no one decides to be honest and admit that they have already taken their share. Instead, they divide the pile up into five piles, for the sixth time, and find that there is yet again one coconut left over, which they give to the monkey.

The Question: What is the smallest amount of coconuts that there could have been in the original pile**?**

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

back to the index

Numbers and Dots ☆☆☆☆☆

This is a famous problem from 1882, to which a prize of $1000 was awarded for the best solution. The task is to arrange the seven numbers 4, 5, 6, 7, 8, 9, and 0, and eight dots in such a way that an addition approximates the number 82 as close as possible. Each of the numbers can be used only once. The dots can be used in two ways: as decimal point and as symbol for a recurring decimal. For example, the fraction $^1/_3$ can be written as

.
.3

The dot on top of the three denotes that this number is repeated infinitely. If a group of numbers needs to be repeated, two dots are used: one to denote the beginning of the recurring part and one to denote the end of it. For example, the fraction $^1/_7$ can be written as

.142857

Note that '0.5' is written as '.5'.

The Question: How close can you get to the number 82**?**

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

back to the index