

[Home](#)[Links](#)[About this Site ▼](#)

Mathematical Problems

- [Traveling Toes](#) ★
- [Big Numbers](#) ★
- [Boys and Girls](#) ★
- [Square Sequence](#) ★★
- [Train Trouble](#) ★★
- [Charlie's Chickens](#) ★★
- [Rowing Across the River](#) ★★
- [Sneaking Spider](#) ★★
- [Buying Bitterballs](#) ★★
- [Speedy Sums](#) ★★
- [Traveling Bird](#) ★★
- [Cork in the Canal](#) ★★
- [Square and Rectangle](#) ★★
- [Fint the Fault](#) ★★
- [Three Taps](#) ★★
- [Notable Number](#) ★★ NEW
- [Baffling Birthdays](#) ★★
- [William's Whereabouts](#) ★★
- [The Prince and the Pearls](#) ★★
- [Plus & Minus](#) ★★
- [Missing Pages](#) ★★
- [Postman Pat](#) ★★
- [All Apples](#) ★★
- [Camel & Bananas](#) ★★
- [Buying Books](#) ★★
- [Four Flies](#) ★★
- [Fabulous Fraction](#) ★★
- [Circling Cyclist](#) ★★
- [Odd Oranges](#) ★★
- [Water Bucket](#) ★★
- [The Cucumber Case](#) ★★
- [Palindrome Puzzle](#) ★★
- [Escalator Exercise](#) ★★

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!

Copyright © 1996-2015. RJE-productions. All rights reserved. No part of this website may be published, in any form or by any means, without the prior permission of the authors.

123 425 **T**raveling **T**oes ★

A school bus travels from Veldhoven to Roosendaal. There are four children in the bus. Each child has four backpacks with him. There are four dogs sitting in each backpack. Every dog has four puppies with her. All these dogs have four legs, with four toes at each leg.



The Question: What is the total number of toes in the bus?



The Answer: [Click here!...](#)

[back to the index](#)

123 425 **Big Numbers** ☆

Using the digits 1 up to 9, two numbers must be made.
The product of these two numbers should be as large as possible. All digits must be used exactly once.



The Question: Which are the requested two numbers?



The Answer: [Click here!...](#)



Another Question: There are two numbers that, when multiplied, give 10000, but neither of them contains a zero.

Which numbers are these?

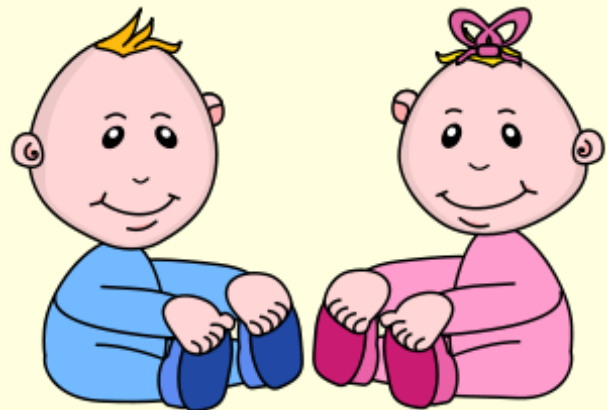


Another Answer: [Click here!...](#)

[back to the index](#)

123 425 **Boys and Girls** ☆

Ronald and Michelle have two children. The probability that the first child is a girl is 50%. The probability that the second child is a girl is also 50%. Ronald and Michelle tell you that they have a daughter.



The Question: What is the probability that their other child is also a girl?



A Hint : [Click here!...](#)



The Answer: [Click here!...](#)

[back to the index](#)

123 425 Square Sequence ☆☆

The numbers 1 up to and including 16 can be placed in sequence in such a way, that the sum of each two consecutive numbers is a square.



The Question: How should this be done?



The Answer: [Click here!...](#)

[back to the index](#)

123 425 Train Trouble ☆☆



Charles walks over a railway-bridge. At the moment that he is just ten meters away from the middle of the bridge, he hears a train coming from behind. At that moment, the train, which travels at a speed of 90 km/h, is exactly as far away from the bridge as the bridge measures in length. Without hesitation, Charles rushes straight towards the train to get off the bridge. In this way, he misses the train by just four meters! If Charles had rushed exactly as fast in the other direction, the train would have hit him eight meters before the end of the bridge.



The Question: What is the length of the railway-bridge?



The Answer: [Click here!...](#)

[back to the index](#)

123 425 Charlie's Chickens ☆☆

Farmer Charlie has a chicken farm. On a certain day, Charlie calculates in how many days he will run out of chicken-food. He notices that if he would sell 75 of his chickens, he could feed the remaining chickens twenty days longer with the chicken-food he has, and that if he would buy 100 extra chickens, he would run



out of chicken-food fifteen days earlier.

? The Question: How many chickens does farmer Charlie have?

! The Answer: [Click here!...](#)

? Another Question: One chicken lays two eggs in three days. How many eggs do three chickens lay in nine days?

! Another Answer: [Click here!...](#)

 [back to the index](#)

Rowing Across the River

Patrick and Eric are on the two opposite banks of a river. They both have a rowing boat.

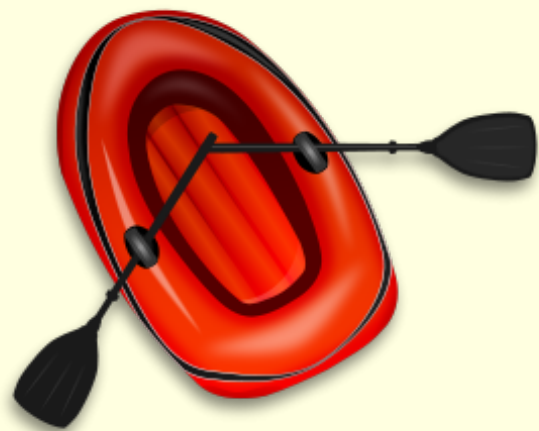
They both start at the same time towards the opposite bank. They pass each other at 180 meters from the bank where Patrick departed. When reaching the opposite bank, they both take a rest for the same amount of time before they return. On the way back, they pass each other at 100 meters from the bank from where Patrick returned.

Patrick and Eric both row with a constant speed, but Eric rows faster.

? The Question: How wide is the river?

! The Answer: [Click here!...](#)

 [back to the index](#)




Sneaking Spider

A rectangular room measures 7.5 meters in length and 3 meters in width. The room has a height of 3 meters. A spider sits 25 centimeters down from the ceiling at the middle of one of the short walls. A sleeping fly sits 25 centimeters up from the floor at the middle of the opposite wall. The spider wants to walk (i.e., move along the walls, floor, and ceiling only) to the fly to catch it.



? The Question: How can the spider reach the fly, walking just 10 meters?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **Buying Bitterballs** ★★

On a nice summer day, two tourists visit the Dutch city of Gouda. During their tour through the center, they spot a cozy terrace. They decide to have a drink and, as an appetizer, a portion of hot "bitterballs" (bitterballs are a Dutch delicacy, similar to croquettes). The waiter tells them that the bitterballs can be served in portions of 6, 9, or 20.

? The Question: What is the largest number of bitterballs that *cannot* be ordered in these portions?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **Speedy Sums** ★★

A salesman drives from Amsterdam to The Hague. The first half of the distance of his journey, he drives at a constant speed of 80 km/h. The second half of the distance of his journey, he drives at a constant speed of 120 km/h.



? The Question: What is the salesman's average speed for the complete journey?

➡ A Hint : The solution is *not* 100 km/h!

! The Answer: [Click here!...](#)

? Another Question: A racecar driver drove, on a 4 km long racecourse, at an average speed of 120 km/h for the first 2 km. How fast does he have to go the second 2 km to average 240 km/h for the entire course?

! Another Answer: [Click here!...](#)

? Yet Another Question: Makkum and Stavoren are two villages. Michael and Donald want to go from Makkum to Stavoren. They leave at the same time. Michael goes by bicycle. Donald goes by car, which is six times as fast as Michael is on his bicycle. Unfortunately, Donald has a car breakdown halfway between Makkum and Stavoren. Fortunately, a passing farmer gives him a lift to Stavoren on his tractor. Unfortunately, the farmer drives only half as fast as Michael drives on his bicycle. Who of the two arrives first in Stavoren?

! Yet Another Answer: [Click here!...](#)

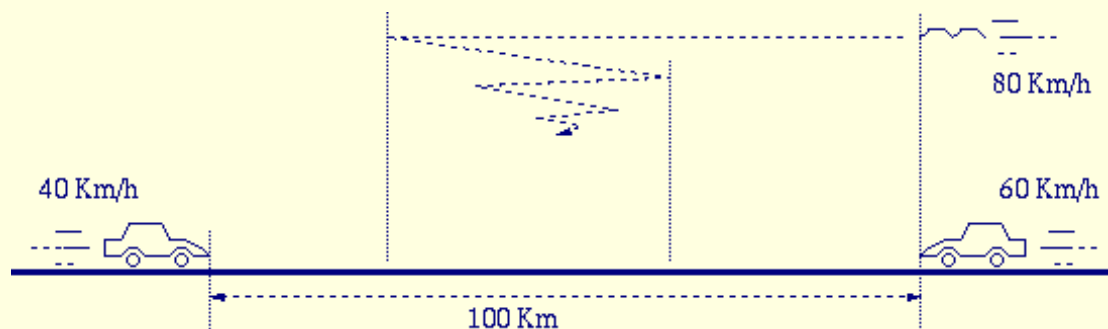
? The Fourth Question: Normally, the train between Utrecht and Amersfoort drives at an average speed of 90 km/h. One day, the train was delayed a little. Because of this, the average speed of the train between Utrecht and Amersfoort was only 70 km/h, and the train arrived four minutes late in Amersfoort. What is the distance between the stations of Utrecht and Amersfoort?

! The Fourth Answer: [Click here!...](#)

 [back to the index](#)

123 425 **T**raveling **B**ird ★★

Consider a road with two cars, at a distance of 100 kilometers, driving towards each other. The left car drives at a speed of forty kilometers per hour and the right car at a speed of sixty kilometers per hour. A bird starts at the same location as the right car and flies at a speed of 80 kilometers per hour. When it reaches the left car, it turns its direction, and when it reaches the right car, it turns its direction again to the opposite, etcetera.



? The Question: What is the total distance that the bird has traveled at the moment that the two cars have reached each other?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **C**ork in the **C**anal ☆☆

A swimmer jumps from a bridge over a canal and swims one kilometer stream up. After that first kilometer, he passes a floating cork. He continues swimming for half an hour, then turns around, and swims back to the bridge. The swimmer and the cork arrive at the bridge at the same time. The swimmer has been swimming with constant effort.



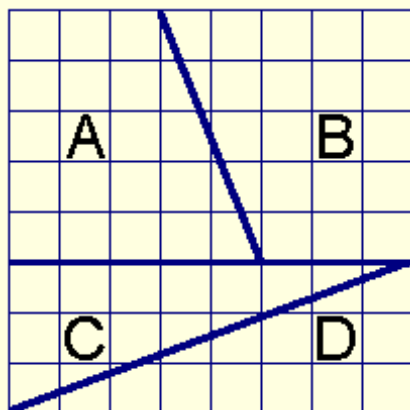
? The Question: How fast does the water in the canal flow?

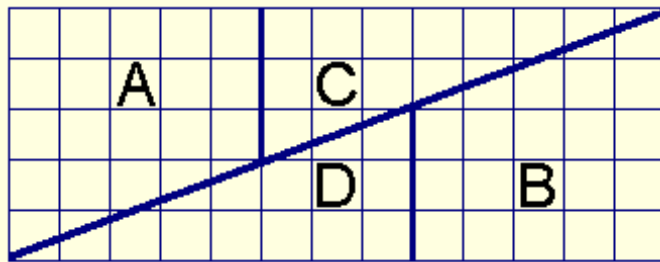
! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **S**quare and **R**ectangle ☆☆

The area of the square shown below is $8 \times 8 = 64$. The square is cut in the four parts A, B, C, and D, which are rearranged into the rectangle shown below. This rectangle has an area of $13 \times 5 = 65$.





? The Question: How can you explain the difference in area?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **F**int the **F**ault ☆☆☆

Below we prove that $2=1$:

Suppose that $x = y$. Then holds:

$$2x - x = 2y - y$$

This we can rewrite to:

$$2x - 2y = x - y$$

This we can rewrite to:


$$2(x - y) = x - y$$

If we now divide by $x - y$, we get:

$$2 = 1$$

? The Question: Where is the fault in this proof?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **T**hree **T**aps ☆☆☆

There is a water-cask with three different water-taps. With the smallest tap, the water-cask can be filled in 20 minutes. With

the middle tap, the water-cask can be filled in 12 minutes.
With the largest tap, the water-cask can be filled in 5 minutes.



? The Question: How long does it take to fill the water-cask with the three taps together?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **Notable Number** ☆☆☆ NEW

There is a unique number of ten digits, for which the following holds:

- all digits from 0 up to 9 occur exactly once in the number;
- the first digit is divisible by 1;
- the number formed by the first two digits is divisible by 2;
- the number formed by the first three digits is divisible by 3;
- the number formed by the first four digits is divisible by 4;
- the number formed by the first five digits is divisible by 5;
- the number formed by the first six digits is divisible by 6;
- the number formed by the first seven digits is divisible by 7;
- the number formed by the first eight digits is divisible by 8;
- the number formed by the first nine digits is divisible by 9;
- the number formed by the ten digits is divisible by 10.



? The Question: Which number is this?

➡ A Hint : [Click here!...](#)

! The Answer: [Click here!...](#)

? Another Question: There is a unique number of which the square and the cube together use all digits from 0 up to 9 exactly once. Which number is this?

! Another Answer: [Click here!...](#)

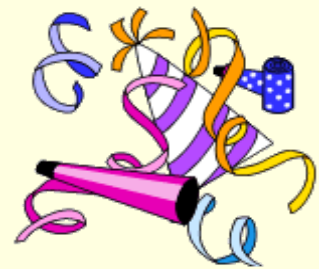
? Yet Another Question: We are looking for a prime number of ten digits, in which all digits from 0 up to 9 occur exactly once. The number may not start with 0. Which number is this?

! Yet Another Answer: [Click here!...](#)

 [back to the index](#)


123 425 **Baffling Birthdays** ★★

In Mrs. Melanie's class are twenty-six children. None of the children was born on February 29.



? The Question: What is the probability that at least two children have their birthdays on the same day?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **William's Whereabouts** ★

William lives in a street with house-numbers 8 up to 100. Lisa wants to know at which number William lives.

She asks him: "Is your number larger than 50?"

William answers, but lies.

Upon this, Lisa asks: "Is your number a multiple of 4?"

William answers, but lies again.



Then Lisa asks: "Is your number a square?"

William answers truthfully.


Upon this, Lisa says: "I know your number if you tell me whether the first digit is a 3."

William answers, but now we do not know whether he lies or speaks the truth.

Thereupon, Lisa says at which number she thinks William lives, but (of course) she is wrong.

? The Question: What is Williams real house-number?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 The Prince and the Pearls ★★



Long ago, a young Chinese prince wanted to marry a Mandarin's daughter. The Mandarin decided to test the prince. He gave the prince two empty, porcelain vases, 100 white pearls, and 100 black pearls. "You must put all the pearls in the vases", he told the prince. "After this, I will call my daughter from the room next door. She will take a random pearl from one of the two vases. If this pearl is a black one, you are allowed to marry my daughter."

? The Question: What was the best way in which the prince could divide the pearls over the vases?

! The Answer: [Click here!...](#)

? Another Question: You have three vases: one vase containing two white pearls, one vase containing one white and one black pearl, and one vase containing two black pearls. From one of these vases, a pearl is taken. This pearl turns out to be white. What is the probability that the other pearl in the same vase is also white?

! Another Answer: [Click here!...](#)

? Yet Another Question: You have ten vases. Five of the vases contain a white pearl

and four of the vases contain a black pearl (note that a vase may contain both a white and a black pearl!). You randomly select one of the ten vases. What is the probability that the vase you chose is empty?

! Yet Another Answer: [Click here!...](#)

 [back to the index](#)

123 **P**lus & **M**inus 425 ☆☆☆



Below is an equation that is not correct yet. By adding a number of plus signs and minus signs between the digits on the left side (without changes the order of the digits), the equation can be made correct.

$$123456789 = 100$$

? The Question: How many different ways are there to make the equation correct?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 **M**issing **P**ages 425 ☆☆☆



From a book, a number of consecutive pages are missing. The sum of the page numbers of these pages is 9808.

? The Question: Which pages are missing?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **Postman Pat** ★★



Postman Pat delivers the mail in the small village Tenhouses. This village, as you already suspected, has only one street with exactly ten houses, numbered from 1 up to and including 10.

In a certain week, Pat did not deliver any mail at two houses in the village; at the other houses, he delivered mail three times each. Each working day he delivered mail at exactly four houses.


The sums of the house numbers where he delivered mail were:

on Monday: 18
on Tuesday: 12
on Wednesday: 23
on Thursday: 19
on Friday: 32
on Saturday: 25
on Sunday: he never works

? The Question: Which two houses did not get any mail that week?

! The Answer: [Click here!...](#)

Copyright © 2002 E.R. van Veldhoven. All rights reserved.

 [back to the index](#)

123 425 **All Apples** ★★



On the market, Mrs. Jones and Mrs. Smith sell apples. Mrs. Jones sells her apples per two for 0.50 euro. The apples of Mrs. Smith are a bit smaller; she sells hers per three for 0.50 euro. At a certain moment, when both women have the same amount of apples left, Mrs. Smith is being called away. She asks her neighbor to take care of her goods. To make everything not too complicated, Mrs. Jones puts all apples to one big pile, and starts selling them for one euro per five apples. When Mrs. Smith returns at the end of the day, all apples have been sold. However, when they start dividing the money, there appears to be a shortage of 3.50 euro.

? The Question: Supposing they divide the amount of money equally, how much does Mrs. Jones lose with this deal?

! The Answer: [Click here!...](#)

 [back to the index](#)


123 425 Camel & Bananas ★★★



A banana plantation is located next to a desert. The plantation owner has 3000 bananas that he wants to transport to the market by camel, across a 1000-kilometer stretch of desert. The owner has only one camel, which carries a maximum of 1000 bananas at any moment in time, and eats one banana every kilometer it travels.

? The Question: What is the largest number of bananas that can be delivered at the market?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 Buying Books ★★★



Two friends, Alex and Bob, go to a bookshop, together with their sons Peter and Tim. All four of them buy some books; each book costs a whole amount in shillings. When they leave the bookshop, they notice that both fathers have spent 21 shillings more than their respective sons have. Moreover, each of them paid per book the same amount of shillings as books that he bought. The difference between the number of books of Alex and Peter is five.

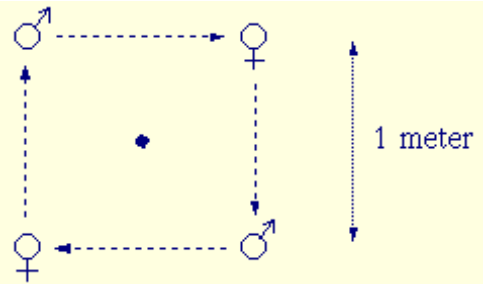
? The Question: Who is the father of Tim?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 Four Flies ★★★

Consider four (dimensionless) flies, two males and two females. They are situated at the corners of one square meter. Every fly tries to reach the male/female fly in front of her/him. Their initial situation is visualized in the picture. Since the flies are flying towards another, they will meet each other at a certain time in the center of the square.



? The Question: What is the length of the path they have traveled at the moment they reach each other?

! The Answer: [Click here!...](#)

[back to the index](#)

123 425 Fabulous Fraction ★★



With all the numbers 0 up to 9 (using each number exactly once), you can make two fractions that add up to exactly 1.

? The Question: How shall this be done?

! The Answer: [Click here!...](#)

[back to the index](#)

123 425 Circling Cyclist ★★



A cyclist drove one kilometer, with the wind in his back, in three minutes and drove the same way back, against the wind in four minutes.

? The Question: If we assume that the cyclist always puts constant force on the pedals, how much time would it take him to drive one kilometer without wind?

! The Answer: [Click here!...](#)

[back to the index](#)

123 425 Odd Oranges ★★

Greengrocer C. Carrot wants to expose his oranges neatly for sale. Doing this he discovers that one orange is left over when he places them in groups of three. The same happens if he tries to place them in groups of 5, 7, or 9 oranges. Only when he makes groups of 11 oranges, it fits exactly.



? The Question: How many oranges does the greengrocer have at least?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 Water Bucket ★★

Calculate the minimum outside surface of a cylindrical bucket with an open upper side, which can hold 30 liters of water.



? The Question: What is the minimum outside surface?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 The Cucumber Case ★★



On a sunny morning, a greengrocer places 200 kilograms of cucumbers in cases in front of his shop. At that moment, the cucumbers are 99% water. In the afternoon, it turns out that it is the hottest day of the year,

and as a result, the cucumbers dry out a little bit. At the end of the day, the greengrocer has not sold a single cucumber, and the cucumbers are only 98% water.

? The Question: How many kilograms of cucumbers has the greengrocer left at the end of the day?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 **P**alindrome **P**uzzle ★★

A number is called a palindrome when it is equal to the number you get when all its digits are reversed. For example, 2772 is a palindrome.

We discovered a curious thing. We took the number 461, reversed the digits, giving the number 164, and calculated the sum of these two numbers:

$$\begin{array}{r} 461 \\ 164 + \\ \hline 625 \end{array}$$

We repeated the process of reversing the digits and calculating the sum two more times:


$$\begin{array}{r} 625 \\ 526 + \\ \hline 1151 \\ 1511 + \\ \hline 2662 \end{array}$$

To our surprise, the result 2662 was a palindrome. We decided to see if this was a pure coincidence or not. So we took another 3-digit number, reversed it, which gave a larger number, and added the two. The result was not a palindrome.

We repeated the process, which resulted in another 3-digit number that was still not a palindrome. We had to repeat the process twice more to arrive at a 4-digit number, which was a palindrome finally.

? The Question: What was the 3-digit number we started with the second time?

! The Answer: [Click here!...](#)

 [back to the index](#)

123 425 Escalator Exercise ★★



You walk upwards on an escalator, with a speed of 1 step per second. After 50 steps, you are at the end. You turn around and run downwards with a speed of 5 steps per second. After 125 steps, you are back at the beginning of the escalator.

? **The Question:** How many steps do you need if the escalator stands still?

! **The Answer:** [Click here!...](#)

 [back to the index](#)