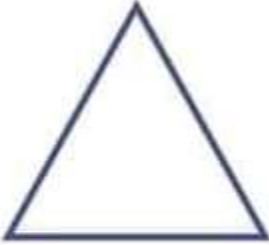# Mind training math puzzles

Chania 10 June
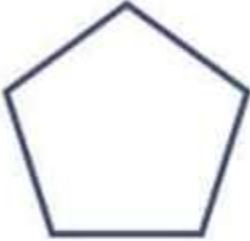
1) The missing number

Difficulty: easy

Find the number corresponding to the hexagon

Solution

$18 = 2 \cdot 3^2 \qquad 32 = 2 \cdot 4^2 \qquad 50 = 2 \cdot 5^2 \quad so \quad 2 \cdot 6^2 = 72$

Difficulty: easy

Move 1 matchstick to correct the answer.

$$8+3-4=0$$
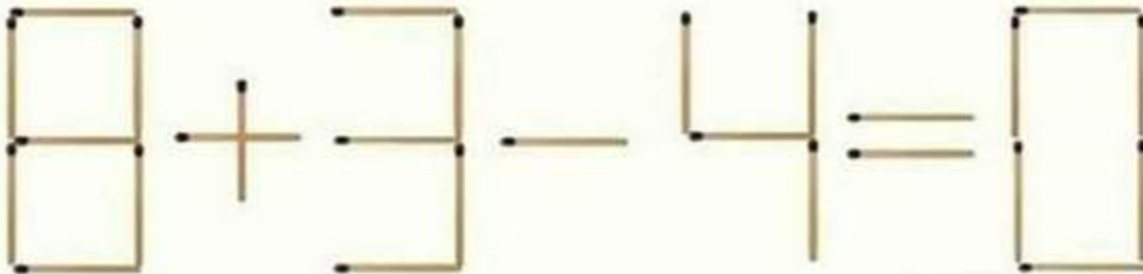
Solution

We move a matchstick from 8 to 0 . So the 8 become 9 and the 0 become 8 and the equality is now correct
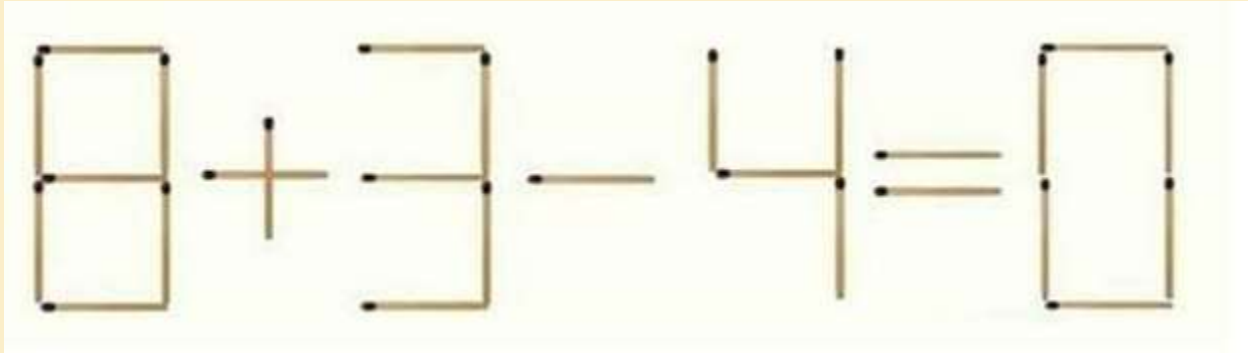
Solution:

3) Can you find the light ball?

Difficulty : easy

We have 9 same balls . But one of them is more light (just few grammars) from the others. We have only the scale you see in the picture. Can you find the light ball only by two weighing?

the scale
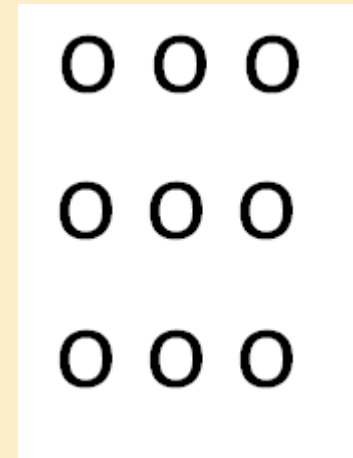
the balls

An example of one weighing
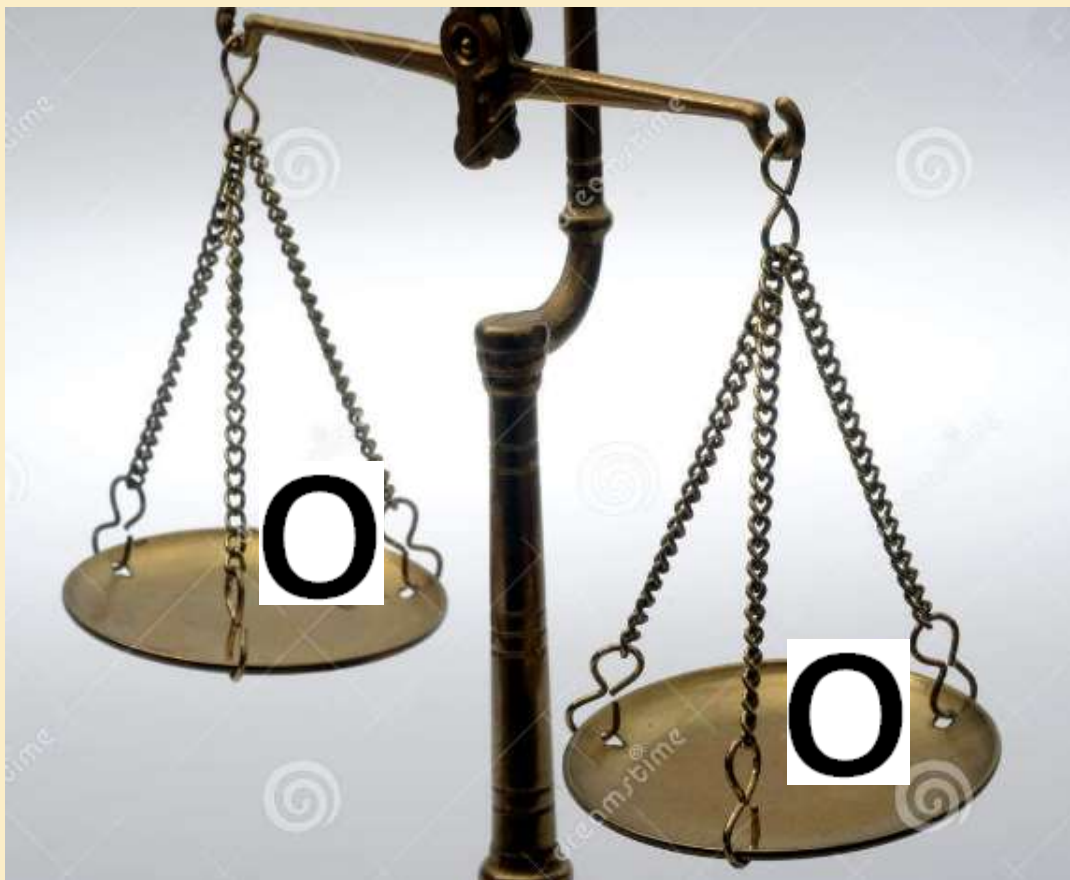
solution

First weighing : We put three balls left and three balls
right. If it balances then the light ball is in the other 3 balls
To find from the three balls the lighter we put one ball
Right and one ball left.

4) The escape of the prisoner

Difficulty : easy

There is a small prison with only 16 cells. There is only one prisoner in any cell. The prisoner we see in the picture has the keys and a knife and he will try to escape. To succeed he must:
a) He must walk through all the cells
b) When he enters in a cell he kills
the prisoner who lives in.
c) He can't enter again in the cell where
is a dead. He will faint (he is very sensitive!).
Can you help him to find the right
path for the freedom?

Example: a path it can take is this in the figure but
it is not the right one because it does not
go through a cell Can you find the right
one?

Solution

He can enter twice only in his cell. So one solution is in the Next figure:

5) Doubling the pool

Difficulty : normal

The owner of a square pool wants to double its surface. He wants the shape to remain square and not cut the 4 trees. Can you help him?
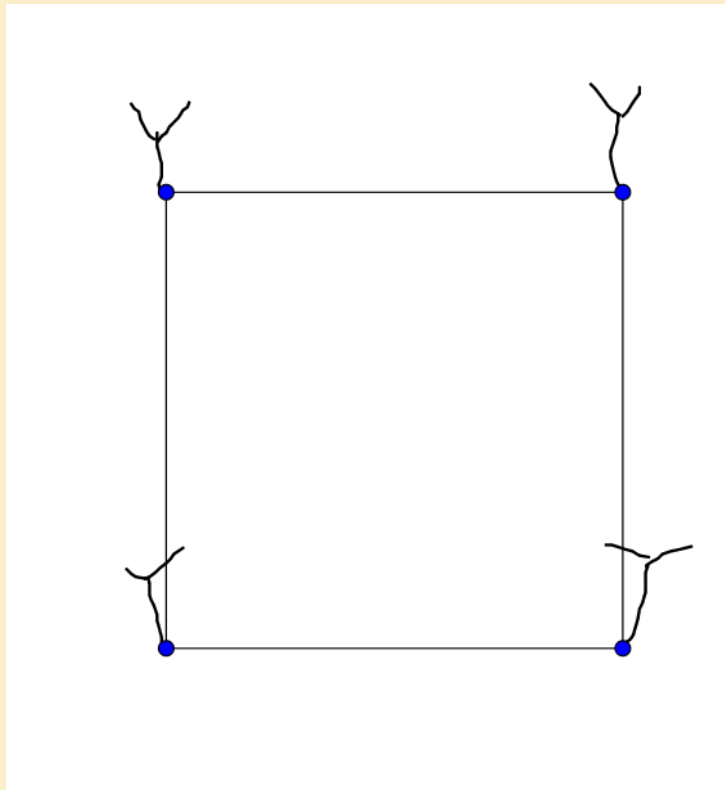
Solution

Without words……
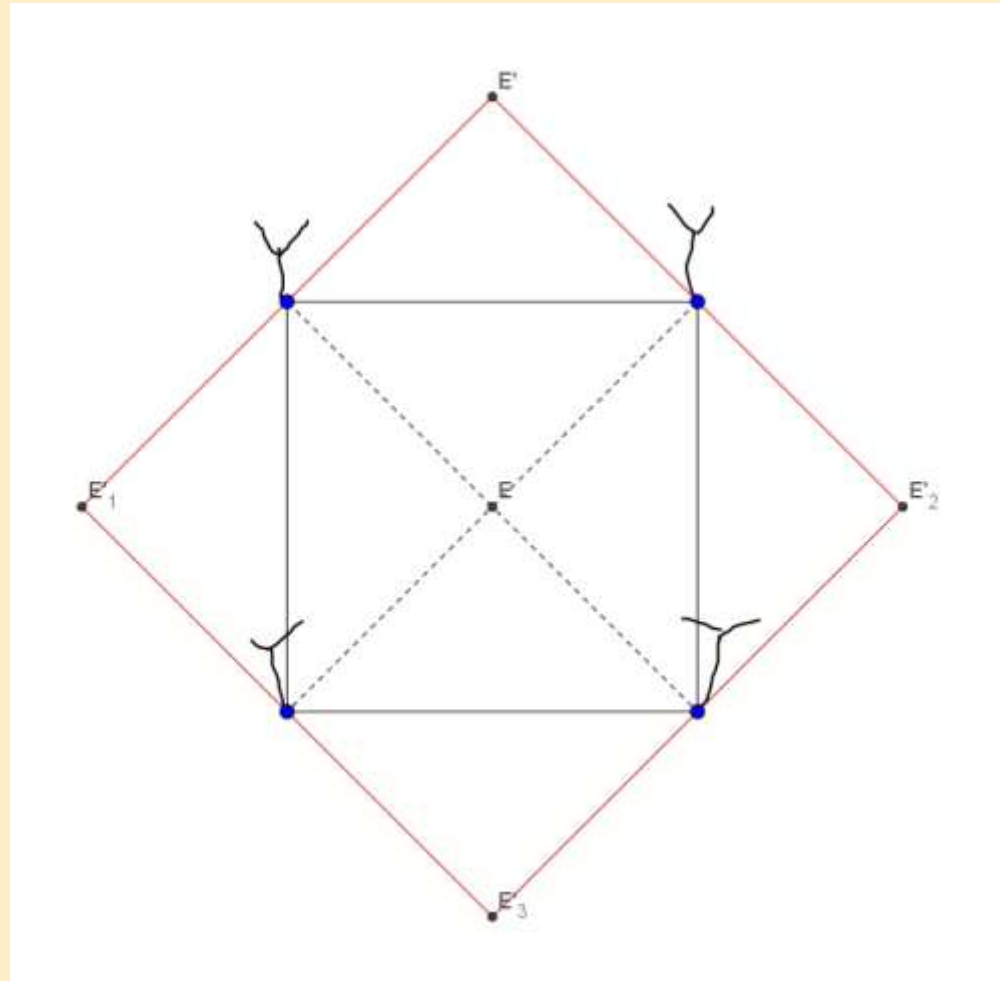
6) Chocolates

Difficulty : easy

Katia buy 5 chocolates and Maria 3 chocolates.
While it is time to eat the chocolates, their friend Marina appears
and ask them to share the chocolates.
After they eat the chocolates Marina give them 8 euros.
How much money should Katia get and how much Maria?

Solution

To share the 8 chocolates the 3 girls means that every girl

take $\frac{8}{3}$ chocolates. But Maria has only $3 = \frac{9}{3}$ chocolates.

So Maria gives only $\frac{1}{3}$ of chocolate to Marina and Katia

give to Marina $\frac{7}{3}$ of chocolate.

So Maria must take 1 euro and Katia must take 7 euro.

7) Cats and mice

Difficulty: easy

5 cats can catch 5 mice in 5 minutes.
How many cats does it take to catch 100 mice in 100 minutes?

Solution

5 cats catch 5 mice in 5 minutes.
So one cat catch one mouse in 5 minute
So one cat will catch in 100m = 20 X 5 m   20 mice
So 5 cats will catch 5 X 20 = 100 mice in 100 minute.

8) The water lilies

Difficulty : easy

A water lily began to grow in a lake.
Each day covers twice the area of the previous one.
In 30 days it covered the whole lake .
In how many days he had covered half of the lake?

Solution

Of course the right answer is 29 days
When it covers the half lake the other day
It will cover the double so it will cover whole the lake.

9) The unfortunate kitten

Difficulty : normal

 A cat is inside a tunnel. The train is getting closer. The cat see the train and think: If I run to exit A which is at $\frac{3}{8}$ of the whole length the train kill me there. Also if I run to the exit B the train kills me at the exit B. The question is: how many times is the train faster from the cat?
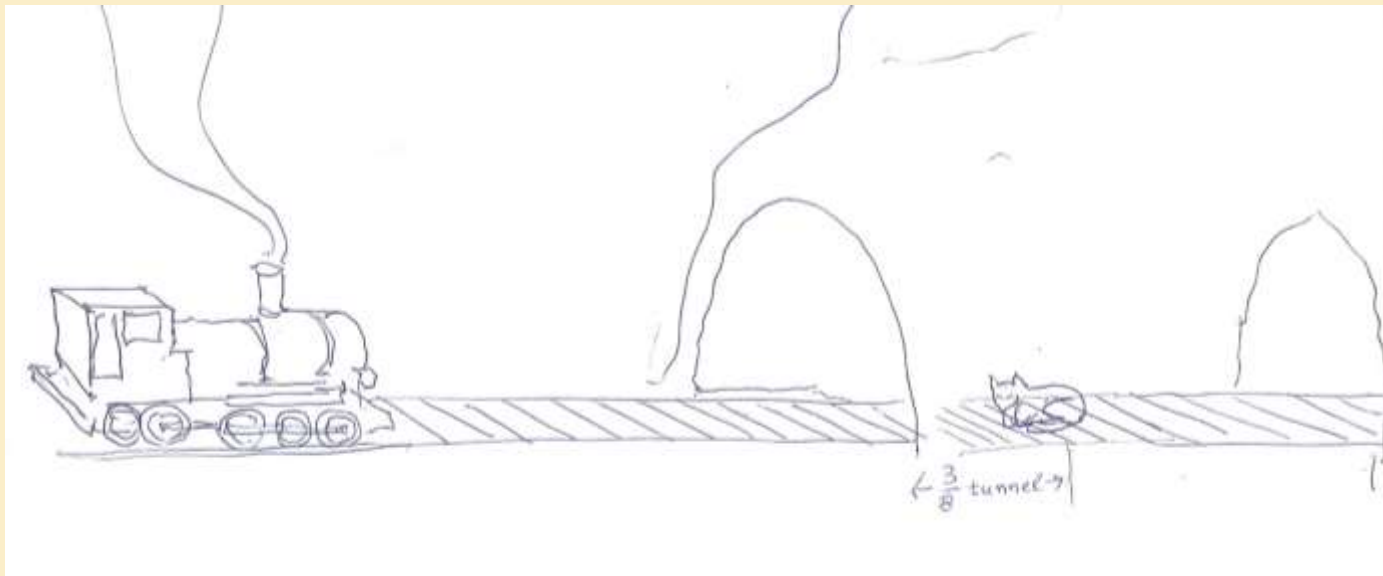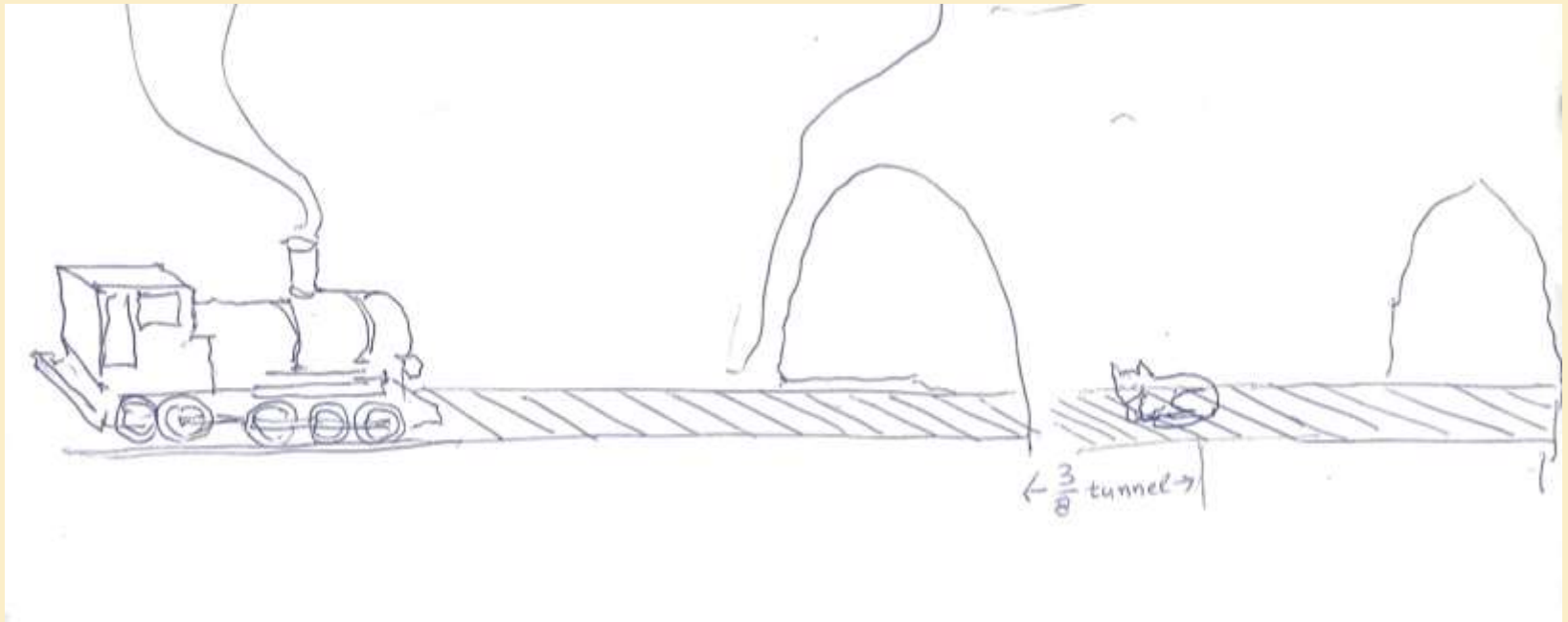
Solution

If the kitten moves to the right when it reaches 6/8 of the tunnel
 the train will be at entrance A .
So as long as it takes the kitten to go through 2/8 of the tunnel,
 it takes the train to go through 8/8.
So the speed of the train is four times that of the cat.

10) The happy father

Difficulty : normal

In class A1 they wrote math test yesterday. John wrote very well , he took grade 20 at the test. His father was very proud of it so he went to school to sprinkle 230 candies to the students of A1. A1 has 25 students.
Everyone took candies as many as he wanted. (this mean that someone can take only one candy but someone else , if he want , can take 20 candies). All the pupils take candies.
Prove that at least two pupils took the same number of candies.

Solution

We will rule out the opposite.

The opposite possibility is that everyone got a different number of candies. Then the one who got the fewest would get at least one. The next one will take at least two and so on.

So we have

$$student1 >= 1$$
$$student2 >= 2$$
$$student3 >= 3$$
$$…………$$
$$…………$$
$$student25 >= 25$$

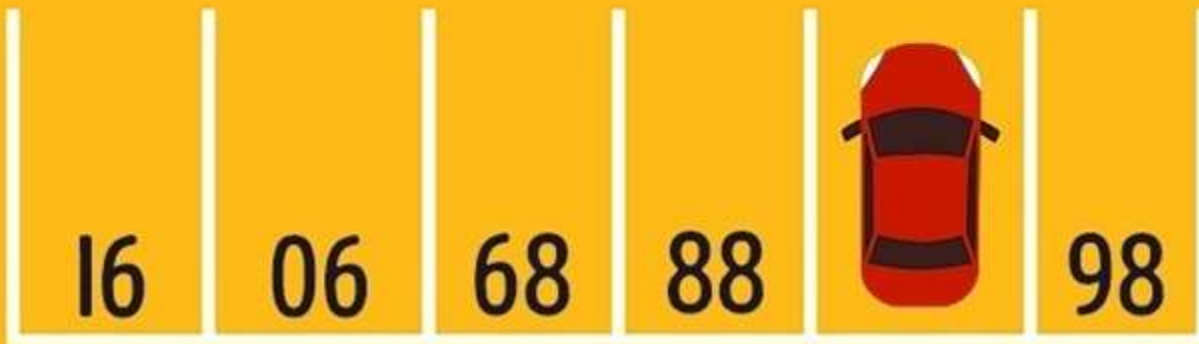
total candies >= 1+2+3+…+23+24+25 = (1+25) X 12,5 = 325

impossible!! so at least two pupils took the same number of candies.

Difficulty : easy

Solution

Just see it from the right side , as you go to take your car :

So the number is 87.