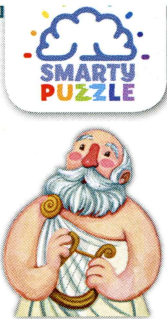




# PYTAGORA

## RULES OF THE GAME



Pytagora, in its Italian version, was the second game published by CreativaMente, in 2003. Following the magical encounter in 2014 with Prof. Luigi Regoliosi, after years of experimentation, Pytagora became in 2018 one of the pillars of the "Contest Mathematics for All" and it was played by tens of thousands of children and teenagers in all schools of Italy. Therefore we decided to develop a game for a wider age range, both to entertain even the youngest, starting from 4 years, and for more complex challenges for high school kids and, of course, by adults, by introducing brackets, powers, roots, fractions and decimal numbers. To do this, we doubled the number of puzzle pieces (from 126 to 252) and we also introduced two special dice, one to train the little ones with numbering and the other one to make each game turn more engaging and interactive.


The new SMARTY PUZZLE PYTAGORA is therefore a richer box to play 6 different games. In addition to PYTAGORA (from 8 years), described at page 2, you can play the two versions PYTAGORA BASIC (from 6 years) and PYTAGORA PRO (from 10 years), described at page 3. At page 4 there are the rules of the game to train with multiplication tables and two games for the little ones: THE NUMBER and THE SQUARE.

Have fun, remembering **Plato's teaching**: "No training discipline has such an efficacy as the science of numbers; but the most important thing is that it awakens those who by nature are sleepy and late of intellect and makes them ready to learn, with good memory and insightful, making them to progress by divine art beyond their natural abilities".


### CONTENTS

- 252 puzzle pieces, each with a number or symbol, divided into 4 different types. The puzzle pieces are plasticized and made of foam, in order to last longer than the traditional cardboard and to make easier the "stick-and-remove" operations during the game. The pieces must always be used by placing the two joints at the top and on the right, and the two holes at the bottom and on the left.

**LEVEL 1**




42 numbers  
from 0 to 9




21 symbols of  
addition and  
subtraction

**LEVEL 2**




35 numbers  
from 0 to 9




21 symbols of  
multiplication  
and division


**LEVEL 3**




29 numbers  
(including  
fractions)



13 symbols to  
build numbers  
(comma and  
period)




56 operation  
symbols  
(including roots  
and powers)




7 open brackets

**ALWAYS AVAILABLE**



9 closed  
brackets



19 symbols of  
equality

- 1 wooden light blue die <sup>10</sup> for the game THE NUMBER
- 1 wooden blue die <sup>11</sup> for the games PYTAGORA and PYTAGORA PRO
- 1 cotton bag <sup>12</sup>
- this instruction manual

### AIM OF THE GAME

Each player receives a set of numbers and symbols at the beginning of the game and everyone must compose equalities with them, by scoring as many points as there are pieces in the equality, plus any bonuses. At the end of each turn the set of pieces is brought back to the same number of pieces. The winner is the first to reach, or exceed, the winning score.





## PYTAGORA

### PREPARATION AND START OF THE GAME

Use all the pieces of **level 1** and **level 2**: all puzzle pieces with numbers **2** **4** and symbols **3** **5** are put into the bag **12**, for a total of **119 pieces**. Put the 19 pieces with the symbols of equality available on the table and leave all the other pieces in the box. Each player randomly draws **10 pieces** from the bag.

The player who has the highest number of 1 starts (and, in the event of a tie, the highest number of 2, then 3 etc.) and the game then proceeds clockwise.

### GAME PLAY

On his turn, the **Current Player (CP)** must:

- roll the **blue die** and follow the indication in the BLUE DIE TABLE
- compose an arithmetic equality **13**, taking an equality symbol **1** from those available, using as many pieces as possible and respecting the Rules for the composition of equalities (page 3). If the CP is not able to compose any equality with his pieces he can pass the turn (without scoring points) or he can take 2 pieces (1 number and 1 symbol, by **choosing** them from the bag) and proceed as required by the die, but paying a **5 points penalty**
- calculate the score of his equality and add it to the score he acquired up to that moment
- draw from the bag as many new pieces as he has just put into play, so as to return to having 10. If he has less than 3 numbers, he can draw more up to have 3, and similarly if he has less than 3 symbols.

### CALCULATION OF THE SCORE

Each piece scores 1 point, with the exception of the symbol = **1** (which does not score any point). Moreover:

- the first crossing (using a piece already on the table **14**) scores 1 point, the second crossing **15** scores 3 points, the third scores 5, the fourth 7, etc.
- when a digit **is used as a ten** it scores 2 points instead of 1, such as the number 1 **16** in the equality **17**. Likewise, when used as hundreds it scores 3 points, as thousands 4 points, and so on. This rule does not apply when composing equalities with identical numbers to the right and left of the equal ( $53 = 53$  scores 4 points)
- the piece with the multiplication **14** scores 2 points instead of 1 and the division **18** scores 3 points. This rule does not apply when:
  - you multiply or divide by 1 ( $3 + 2 = 5 \times 1$  scores 6 points)
  - you compose equalities with identical operations to the right and left of the equal ( $6 \times 12 = 6 \times 12$  scores 8 points)
  - you divide a number by itself ( $25 \div 25 = 1$  scores 6 points)
- if **all the pieces of your equipment** are used you will earn 3 bonus points



#### BLUE DIE TABLE



...=C

instead of composing a new equality the CP must continue an existing equality (e.g.  $6 + 1 = 7 = 21 \div 3$ ), scoring points only for the new added pieces ( $21 \div 3$  scores 7 points). If it is the first round of the whole game, the CP rolls the die again

+3

before starting the CP draws 3 new pieces from the bag and starts his turn with 13 pieces

\*2

the CP makes one of his pieces double (for example in the equality **17** he can double the value of the piece with the division symbol **18**, by scoring 14 points instead of 11)

A=B  
C=D

instead of composing a single equality, the CP has the opportunity to compose two



before starting the CP steals one piece of his choice from any of the other players. That player then draws a new piece from the bag to return to having 10



the CP places the die on the preferred face, and he does that operation

### END OF THE GAME

The winner is the first player to reach, or exceed, the winning score, once all players have done the same number of turns. In the event of a tie, the players with the lowest number of pieces take another turn each, and so until one is the winner. It is suggested to set the target of **41 points** as the winning score. It is however the players' decision to raise or lower the winning score, depending on whether they want to play longer or shorter matches.



## RULES FOR THE COMPOSITION OF EQUALITIES

- Equalities can be composed either as rows or as columns.
- At each turn, unless otherwise indicated by the blue die, it is possible to compose only one equality, **without modifying** (for example by continuing 19) any of the equalities already on the table.
- When composing a new equality horizontally none of the new pieces must hook 20 any other horizontal equality already on the table, and likewise for the vertical equalities.

- All the equalities that are composed must comply with the following **rules regarding the number zero**:
  - zeroes are not allowed at the beginning of a number ( $6 + 3 = 09$ ), nor at the end of the decimal part of a number ( $1 \div 4 = 0,250$ )
  - multiplication by zero is not allowed ( $5 \cdot 5 = 0 \times 12345$ )
  - zero cannot be divided by any number ( $3 \div 0 = 0 \div 12345$ )

13 First equality = 7 points (multiplication scores 2 points)

14  $4 \times 3 = 8$

15  $16 \div 4 = 7 - 3$

16  $16 \div 4 = 7 - 3$

17 Third equality = 11 points (the digit 1 used as ten scores 2 points)

18  $16 \div 4 = 7 - 3$

19 It is not allowed to continue an equality that had been composed in a previous round

20 This equality cannot be composed because this piece touches the piece with the 4, hooking to another row already on the table

Fourth equality = 8 points (the second crossing scores 3 bonus points)

21  $6 + 3 = 09$

22  $5 \cdot 5 = 0 \times 12345$

23  $3 \div 0 = 0 \div 12345$

### PYTHAGORA BASIC

**PREPARATION AND START OF THE GAME** Use all the pieces of level 1: put 2 and 3 into the bag, for a total of 63 pieces.

**GAME PLAY** At his turn, the CP does not roll the blue die, therefore he must immediately compose an equality, calculate the score and draw from the bag to return to having 10 pieces. At the end of the last game turn, the CP puts all his leftover pieces back into the bag.

**END OF THE GAME** If you play 4 the game lasts 2 rounds for each player (8 rounds in total), 3 rounds If you play 3 and 4 rounds If you play 2. The player with the highest score wins.

### PYTHAGORA PRO

Use all the pieces of the box: put all the pieces 2 3 4 5 6 7 8 into the bag 12, while the green pieces 1 and 9 are always available on the table. Each player always has 12 pieces instead of 10. There are no other differences except for the score of the new symbols. The open parenthesis scores 1 point, while the closed parenthesis does not score any point (like the other green piece 1 always available). The pieces 6 and 7 score the following points:

3 POINTS

4 POINTS

5 POINTS

(\*) The roots and powers of 1 score 1 point (e.g.,  $\sqrt{1}$  scores 2 points)

(\*\*) After the comma, a digit used for cents scores 2 points, for thousandths 3 points, etc. (e.g., 0,25 scores 8 points:  $1+4+1+2$ )









## THE NUMBER PREPARATION AND START OF THE GAME

Put all the pieces with the numbers 2 and 4 into the bag, for a total of 77 pieces. Each player randomly draws 5 pieces from the bag. 1 piece is drawn and placed in the centre of the table. This piece is called the NUMBER. The youngest player starts, and the game then continues clockwise.

### GAME PLAY

The CP rolls the light blue die 10 and must put one of his pieces on top of the NUMBER, according to the indication of the die, as indicated in the LIGHT BLUE DIE TABLE. For example, if the die indicates +1 21 and the NUMBER is a 6, the CP must put a piece with the 7, which becomes the new NUMBER. If instead he cannot put any of his pieces above the NUMBER, then he must draw a new piece from the bag and, if this piece can be played, he can immediately put it on top of the NUMBER.

#### LIGHT BLUE DIE TABLE

	the next number (e.g. if the NUMBER is 6 you must put 7)		the previous number (e.g. if the NUMBER is 6 you must put 5)
	a higher number (e.g. if the NUMBER is 6 you can put 7 or 8 or 9)		a smaller number (e.g. if the NUMBER is 6 you can put any number from 0 to 5)
	the same number (e.g. if the NUMBER is 6 you must put another 6)		the CP can put the die on the preferred face

**REMARK:** If the CP has the possibility to put a second piece on top of the NUMBER (and then possibly also a third one and so on) he can do so, for example putting a piece with the number 8 on top of the piece with the 7 that he had just put.

### END OF THE GAME

The game ends when a Player, the Winner, puts the last of his pieces.

## MULTIPLICATION TABLES

### PREPARATION AND START OF THE GAME

Place on the table 7 pieces with the multiplication sign 5 and all pieces with the equality symbol 1. Put all the pieces with the numbers 2 and 4 into the bag, for a total of 77 pieces. Each player randomly draws 10 pieces from the bag.

### GAME PLAY

Two numbers are randomly drawn from the bag and a multiplication sign is taken from the table to compose the corresponding operation. For example, if a 3 and an 8 are drawn, an X is taken to compose the 3 X 8 sequence. Each Player who has the pieces (1 or 2) corresponding to the result takes an equality symbol and attaches them to the sequence. For example, if a player has both 2 and 4 he takes a piece of equals from the table to compose the sequence 3 X 8 = 24. If other players also have the 2 pieces, each one takes an equal symbol from the table and continues the sequence by adding their pieces: 3 X 8 = 24 = 24, and so on. Before ending the turn, each player draws a new piece from the bag.

### END OF THE GAME

The game ends when 7 game turns have been made. Whoever has the lowest number of pieces wins. In the event of a tie, the players with the same high score take another turn each, using a new piece with the multiplication sign, until there is only one winner.

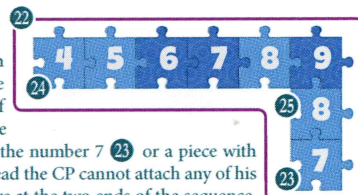
## THE SQUARE

### PREPARATION AND START OF THE GAME

Put all the pieces with the numbers 2 and 4 into the bag, for a total of 77 pieces. Each Player randomly draws 10 pieces from the bag. A piece with the number 5 26 is taken and placed in the centre of the table. The youngest player starts, and the game then continues clockwise.

### GAME PLAY

The CP must put one of his pieces on the table by attaching it to one of the numbers already present. For example, if on the table there is the sequence 22, the CP can put a piece with the 6 UNDER the number 7 23 or a piece with the 3 BEFORE the number 4 24. If instead the CP cannot attach any of his pieces to one of the two numbers that are at the two ends of the sequence, then he must draw a new piece from the bag and, if the piece can be played, the CP can immediately attach it to one of the two ends.



### REMARKS:

- When the sequence reaches 9 (to the right) or 0 (to the left), the CP can start the two vertical sides of the square, attaching the number 8 25 under 9 to start the descending sequence (9 8 7 etc.) or attaching the number 1 below 0 to start the ascending sequence (0 1 2 etc.)
- When one of the two vertical sequences has been completed, the CP can start the fourth side of the square, horizontally

### END OF THE GAME

The game ends when the square is completed, by placing on the table the last of the 36 pieces. Whoever has the lowest number of pieces wins. In case of a tie, whoever has put the last piece wins.

### GAME VARIATION: EVEN AND ODD

You can play by separately composing two smaller squares: the one with even numbers (0 2 4 6 8) and the one with odd numbers (1 3 5 7 9). At the beginning, both a piece with the number 4 and a piece with the number 5 are placed on the table. At his turn, the CP can attach one of his pieces to any of the two squares. The game ends when both squares are completed.