

## Mathematics Teaching-Research Journal On-Line

A peer-reviewed scholarly journal

Editors: Bronislaw Czarnocha (Hostos Community College)

Vrunda Prabhu (Bronx Community College)

Anne Rothstein (Lehman College)

City University of New York

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### **Mathematical Domino**

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**Mathematical Domino** is directed primarily towards the work with students of elementary grades, and especially to those students who believe and are convinced that mathematics is understandable only for the chosen. Working with students in classrooms with different intellectual level, we have attempted to encourage students to a different view on mathematics and to show that learning mathematics can give joy to everyone, not only those more able mathematically. We proposed mathematical domino. The effects didn't let us wait for too long. In fact it is those, mathematically weaker children forced us to create a domino for each following class. To our surprise they didn't ask for grades. They were happy that were able to play and to do the problems independently. They didn't ask for a break between classes forgetting about it completely, while engrossed in the game. Looking at their joy, happiness in their eyes one could not disappoint them. It wasn't easy. Consequently, the presented collection of domino games from different areas of mathematics had been developed on the basis of authentic needs of pupils. We would like to encourage teachers, colleagues to work wit this game. We are convinced that it will help students to get better results in their learning; we assure that well planned classroom with the domino game will not be wasted.

#### **How to work with the mathematical domino?**

The essential aspect of the game is exactly the same as in the standard domino game.

Each piece has two parts, one of them is the answer to a problem stated on a different

piece, the other is a new problem. For example, if one half of the piece has  $8\frac{1}{5}$  and the

other half of the piece has  $\frac{34}{40} - \frac{20}{40}$ , the first one is the answer to a problem stated in

another domino piece, for example  $8\frac{4}{5} - \frac{3}{5}$ , while the answer to  $\frac{34}{40} - \frac{20}{40}$  is still on a

different domino piece. The collection of pieces in on set is designed so as to create the closed chain. This can be done by one, two or more students playing the game. It can also be done by one student as a homework. The number of players is arbitrary but it is limited by the number of domino pieces. Different sets have different number of pieces; not too many though in order not to discourages students. And not too few, to be able to work in a group. The rules of the game can be exactly the same as in a standard game but also one can decide on different rules. Students can use books or notebooks so that they

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can definitely finish each game. Playing the game they have the possibility for self-control; finding the correct piece they convince themselves that they did it correctly. The game is designed so that that it's easy step-after-step process, and repetition of rules and formulas allow for self-verification. It provides the possibility to trace one's own errors and correct them, hence students are stimulated for self-reflection.

Playing the game creates the conditions for independent action through:

- Choice and planning of rules of the game
- The plan of the game
- Checking one's own computations.

Playing the game shapes and develops student imagination. Often, creating the loop, students try to give it an original shape. Thanks to the game-like nature of the exercise, understanding and retention of different mathematical issues becomes easy and mobilizes the child to independent work. The game develops intellectual activity and motivates creativity (especially when students design their own domino sets).

**Mathematical domino** is helpful not only for students, for whom mathematics is more difficult but also for those children who like and enjoy mathematics, and would like to calculate faster. Many of the domino calculations can be performed faster in memory without writing in the notebook.

The game was designed in 3 versions, A,B,C. The version A being the easiest, B – more difficult although it contains some elements from A. The role of the version A is to encourage the student to reach for more difficult versions. The version B is designed for a student, who having done the version A, would like to try something more difficult. Similar relations is between the version B and the version C. Independently of these relationships, each set has its own independent structure. The sets are not arranged accidentally. Each example and its order is chosen so that the student, almost without noticing it, was solving more difficult problems. The game can be used as a review, as the beginning of the class or as a homework.

The authors wish you nice and fruitful play!

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$$\frac{5}{17} - \frac{3}{17} + \frac{9}{17}$$

$$\frac{1}{10}$$

$$\frac{11}{17}$$

$$\frac{12}{15}$$

$$\frac{6}{31}$$

$$\frac{5}{7}$$

$$7$$

$$1$$

$$3\frac{1}{4}$$

$$5\frac{3}{8}$$

$$5\frac{1}{2}$$

$$7\frac{2}{13}$$

$$2\frac{11}{12}$$

$$4\frac{4}{5}$$

$$18\frac{1}{7}$$

32. Dodawanie i odejmowanie ułamków zwykłych o jednakowych mianownikach

34. Dodawanie i odejmowanie ułamków zwykłych o różnych mianownikach

$$\frac{1}{2} + \frac{3}{5}$$

$$1\frac{19}{30}$$

$$\frac{1}{2} + \frac{3}{4}$$

$$2\frac{2}{5}$$

$$12\frac{11}{18}$$

$$\frac{7}{4}$$

$$11\frac{7}{36}$$

$$\frac{4}{5} + \frac{5}{6}$$

$$\frac{1}{10}$$

$$\frac{2}{36}$$

$$\frac{5}{12}$$

$$1\frac{1}{4}$$

$$3\frac{32}{45}$$

$$1\frac{7}{24}$$

$$3\frac{7}{15}$$

33. Znajdowanie wspólnego mianownika

$$\frac{2}{3} : \frac{3}{4}$$

$$\frac{1}{4} : \frac{3}{10}$$

$$\frac{3}{4} : \frac{9}{14}$$

$$\frac{7}{8} : \frac{4}{5}$$

$$\frac{5}{8} : \frac{4}{6}$$

$$\frac{3}{4} : \frac{5}{9}$$

$$\frac{1}{42}$$

$$\frac{7}{10} : \frac{5}{6}$$

$$\frac{9}{11} : \frac{4}{5}$$

$$\frac{4}{1} : \frac{3}{5}$$

$$\frac{5}{3} : \frac{3}{5}$$

$$\frac{4}{13} : \frac{5}{15}$$

$$\frac{5}{11} : \frac{12}{20}$$

$$\frac{17}{37} : \frac{50}{75}$$

$$7 \cdot \frac{5}{6}$$

$$36$$

$$\frac{9}{2} : \frac{1}{1}$$

$$\frac{55}{5}$$

$$\frac{24}{4}$$

$$\frac{18}{18}$$

$$60$$

$$\frac{9}{11} : \frac{4}{5}$$

$$30$$

$$\frac{3}{5} : \frac{7}{6}$$

$$\frac{55}{5}$$

$$\frac{18}{18}$$

$$\frac{50}{75} : \frac{17}{37}$$

35. Mnożenie ułamków zwykłych przez liczbę naturalną

$$\frac{2}{3} : \frac{3}{4}$$

$$\frac{1}{4} : \frac{3}{10}$$

$$\frac{3}{4} : \frac{9}{14}$$

$$\frac{7}{8} : \frac{4}{5}$$

$$\frac{5}{8} : \frac{4}{6}$$

$$\frac{3}{4} : \frac{5}{9}$$

$$\frac{1}{42}$$

$$7 \cdot \frac{5}{6}$$

$$36$$

$$\frac{4}{1} : \frac{3}{5}$$

$$\frac{55}{5}$$

$$\frac{24}{4}$$

$$\frac{18}{18}$$

$$60$$

$$\frac{9}{11} : \frac{4}{5}$$

$$30$$

$$\frac{3}{5} : \frac{7}{6}$$

$$\frac{55}{5}$$

$$\frac{18}{18}$$

$$\frac{50}{75} : \frac{17}{37}$$