# Another Domino Dilemma

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**Grade Levels 3 - 5**

# Another Domino Dilemma

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## Context

Two months ago we had given this class of fourth and fifth grade students several domino tasks from which they could choose which ones they wanted to solve. Well, here is another! It was helpful for students to have solved the other "Domino Dilemma" before completing this one (Miss Amico's crazy Italian grandparents have a set of dominos with the digits 0 - 9 on them. Dominos we commonly use have digits 0 - 6 on them and come 28 in a set. How many dominos come in a set with digits 0 - 9 on them?)

## What This Task Accomplishes

This task assesses student's ability to find a pattern (in order to figure out all possible domino pip combinations) and then to create an organized method for determining the sum of the pips.

## What the Student Will Do

Most students will create a list of all possible domino combinations, usually in some organized fashion and then will do some subtotaling and then find the grand total of their results.

## Time Required for Task

60 minutes

## Interdisciplinary Links

The studies of games and other forms of entertainment.

## Teaching Tips

Make sure students have lots of opportunities to work with dominos before giving this task. Also, we adapted the task for a student in the class who has special needs and who had an IEP goal of understanding "more than" and "less than".

Which dominos have more than 8 pips?  Which dominos have less than 8 pips?

## Suggested Materials

- Dominos
- Calculators
- Graph paper

## Possible Solutions

There are 168 pips.

## Benchmark Descriptors

**Novice**
Although this student finds the correct solution, his/her process of finding the total is awkward and rudimentary. His/her work lacks organization and is difficult to follow. S/he uses math language incorrectly and his/her representation lacks labels.

**Apprentice**
This student arrives at an incorrect answer, which if s/he had gone back and checked his/her work could have been remedied. S/he has an interesting way of finding all domino combinations, which could have been more clearly presented. The reader has to fill in many details to understand what was done. This student's work has good potential and s/he should be encouraged to go back and make revisions to better communicate his/her solution.

**Practitioner**
This student uses a systematic approach to solving the task by finding a pattern and creates a representation to express his/her solution. This student could be encouraged to look more closely at his/her results to see if s/he can notice any patterns, relationships or generalizations and probably could do so given the organization s/he used in his/her approach. His/her representation could be labeled and his/her communication more clear.

**Expert**
This student solves the task in a similar way to his/her peers, but creates a novel way of finding the total. S/he then solves the problem again, using the same strategy, for dominos having 0 - 9 pips. It would have been neat if the student had been able to verify his/her solution to the task using his/her extension as a way of verifying his/her solution.

**Novice**

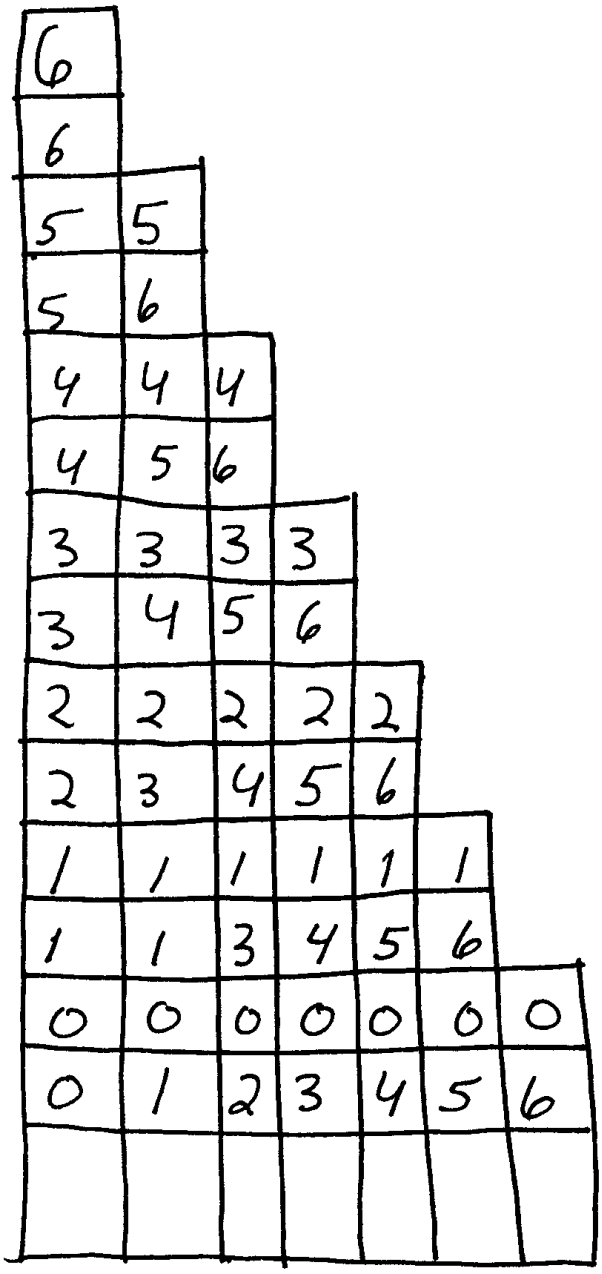
The student incorrectly uses the terms "average" and "graph".

Dear Mrs. Amico,
the math problem I just did was Domino dilemma #4. In this Problem they asked me to Find Out the number of pips in a Set of dominoes.

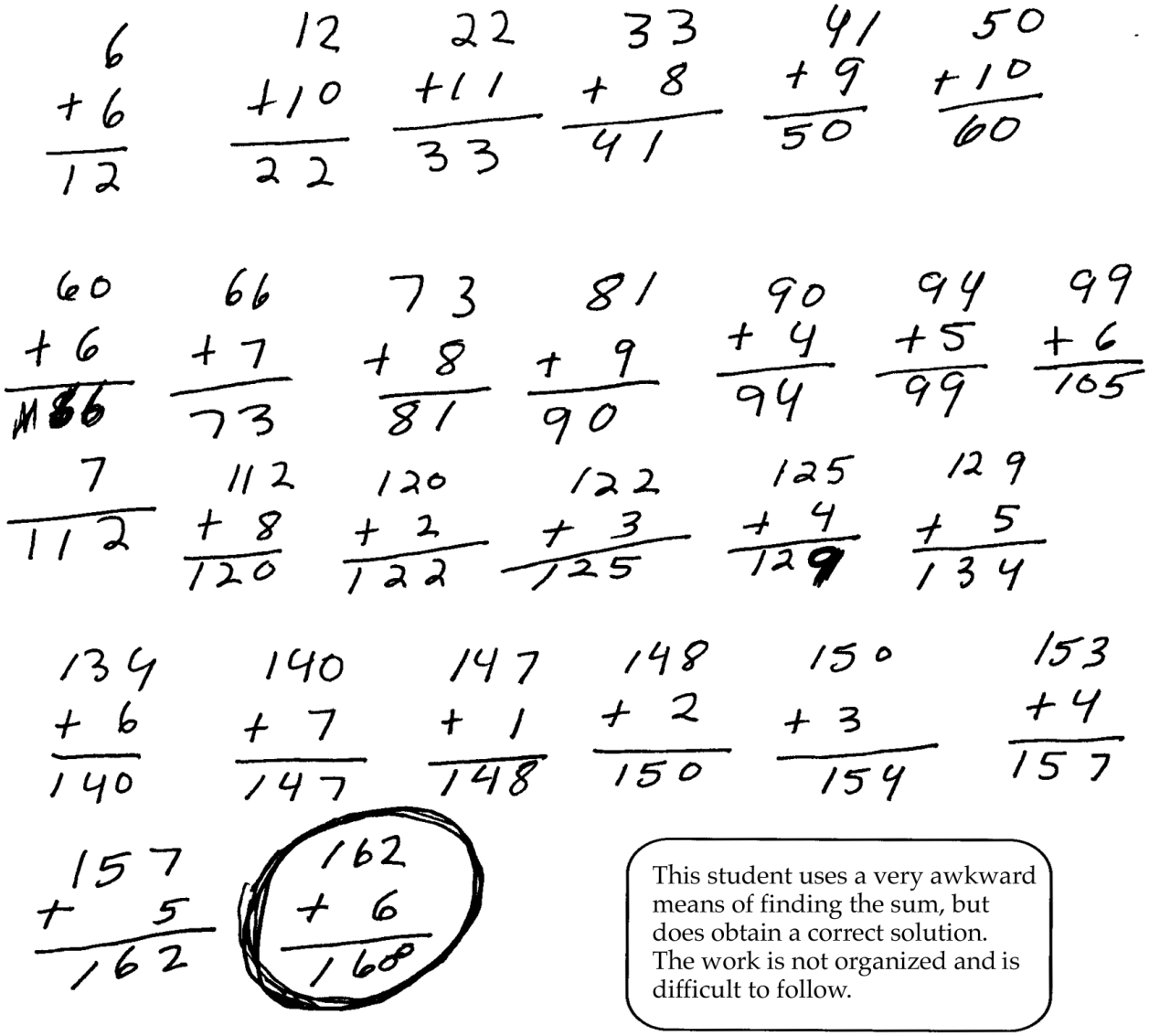
I figured out this problem by making a stair case shaped graph. then I started to add all of the numbers up until I came up to an average of one hundred and sixty eight.

Thats how I figured it out.

## Novice



## Novice




This student uses a very awkward means of finding the sum, but does obtain a correct solution. The work is not organized and is difficult to follow.

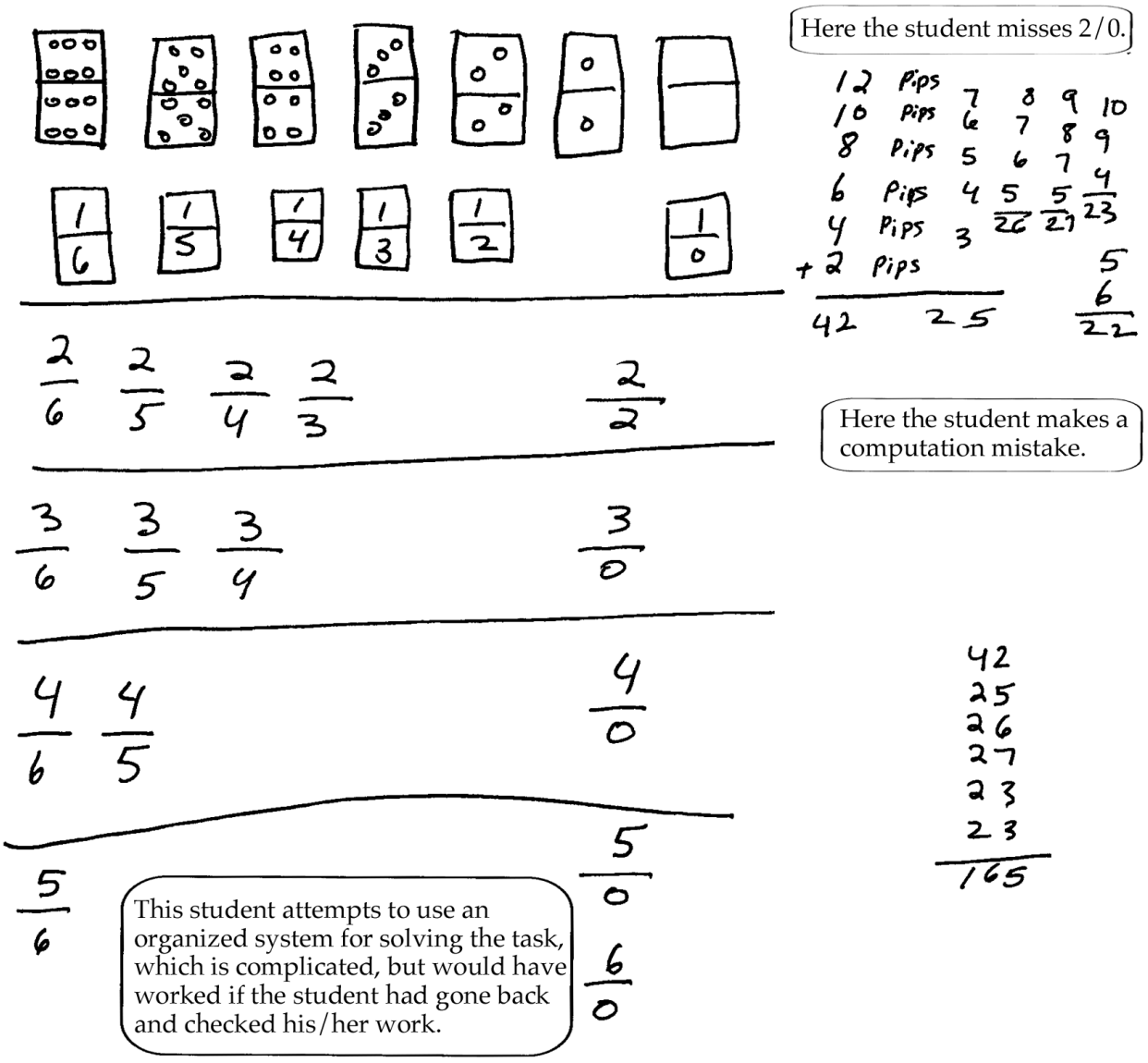
## Apprentice

This student clearly communicates her/his strategy, but in some places (especially on the next page) the reader has to fill in details for the solution to make sense.

Dear Miss Amico

I did Domno Dilemma #4. I found there are 165 pips in a regular set of 28 dominos. Let me explain further. I drew all the doubles, (have the (same number of Pips. ontop as on the bottom.) then, like under  , I would draw 6 pips over 5 pips, 6 pips over 4 pips, and so on. I clid that with all other doubles. Then I wrote the number of Pips on each double and added them up. 42 I did that with all the dominos with one pip on top and 1-6 on the bottom. I did that with dominos with 2 Pips on top, 3, 4, 5 and 6. I added all the sums together, and got 165.

## Apprentice

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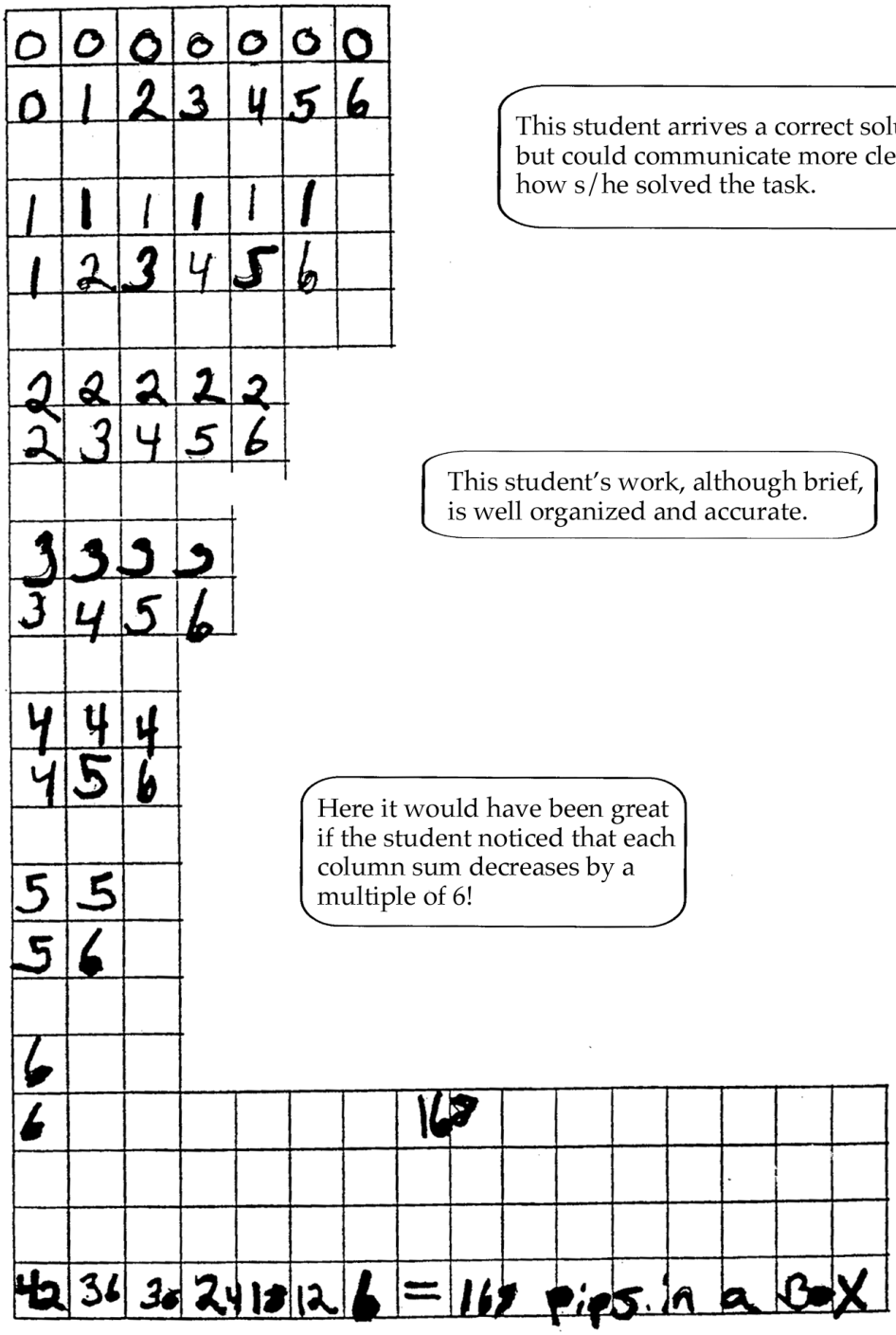
## Practitioner

**1-Centimeter Squares**

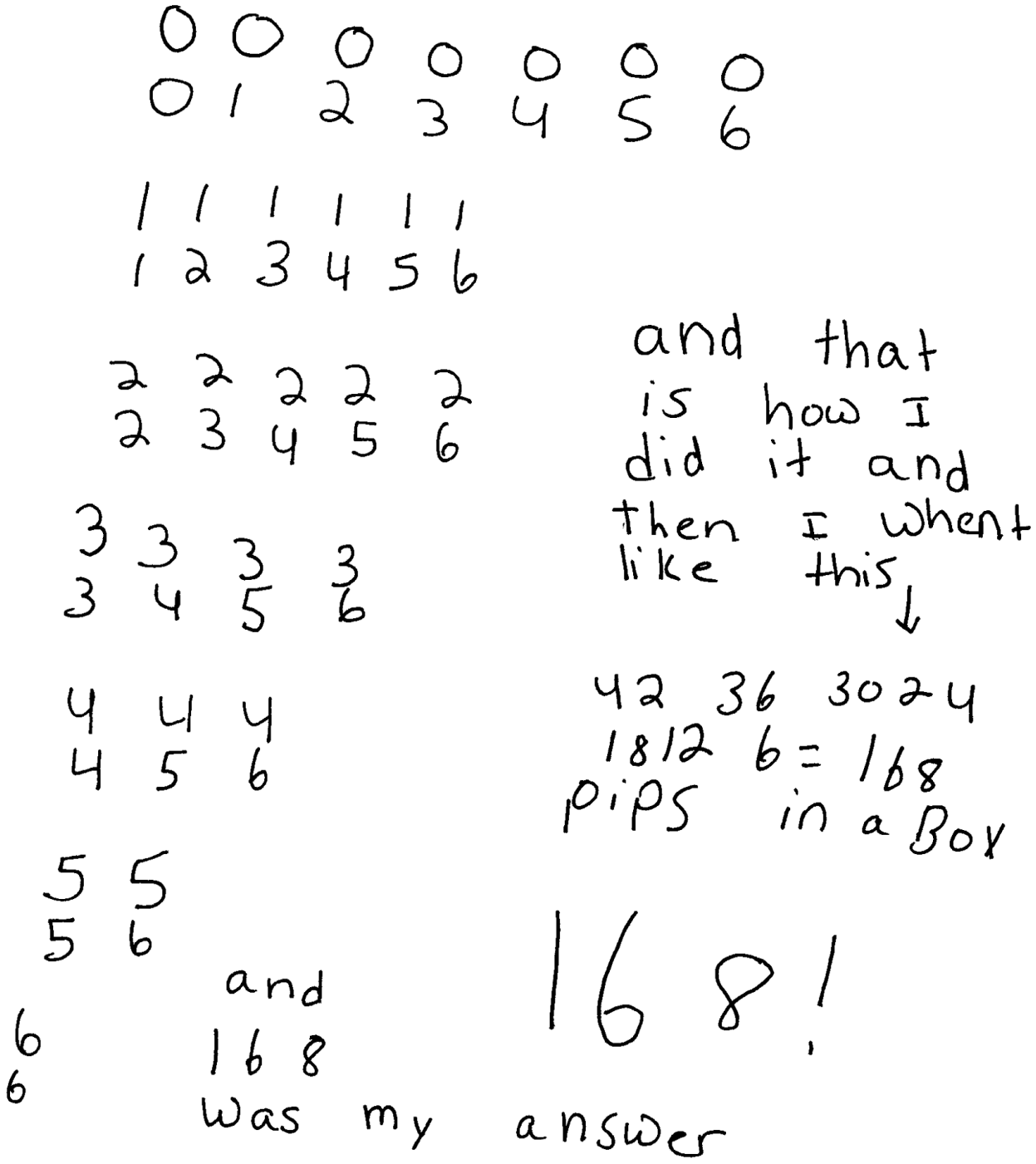



This student arrives a correct solution but could communicate more clearly how s/he solved the task.

This student's work, although brief, is well organized and accurate.

Here it would have been great if the student noticed that each column sum decreases by a multiple of 6!

**Practitioner**

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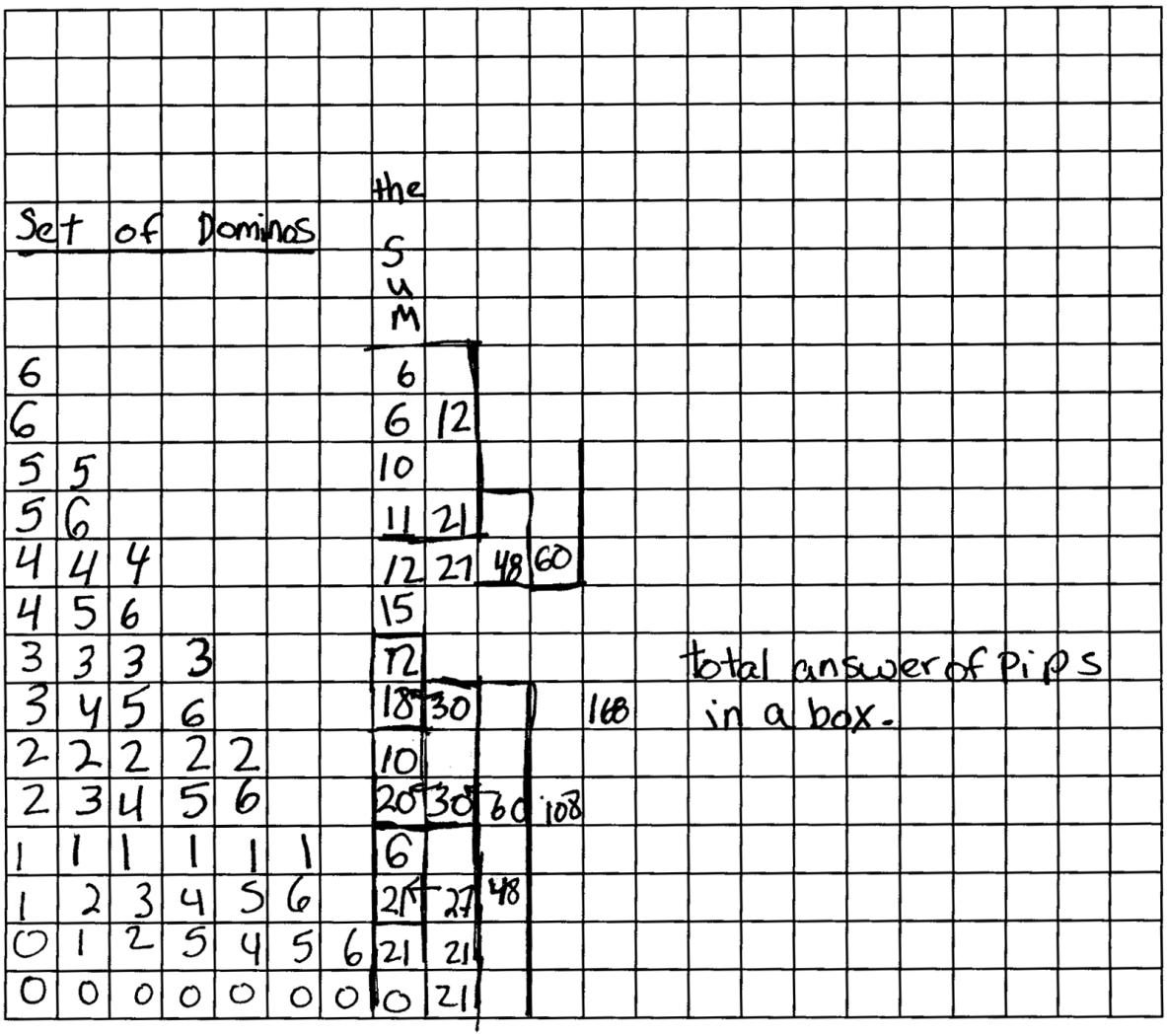
**Expert**

The student explains how she/he solves the problem.

Dear Mrs. McKeqney

First I made a set of dominos on a peace of graph paper. then I kept adding the pips on the dominos together intiLL I got the anser the next thing I did is LaBled it, the total number of Pips in a box is 168

## Expert




The student's strategy of creating an organized list and creating a flow chart for finding the sum would work for this problem.

The student's work is labeled and accurate.

## Expert

first I made a set of old dominos and then I added them as I went up the rows and then I got the total number of pips on the dominos and then I labeled them what they were and then I was done!

The student extends the task by also solving the task (using the same strategy) for dominos having pips 0-9.