# ACADEMICIA 

An International Multidisciplinary Research Journal
(Double Blind Refereed \& Peer Reviewed Journal)

## DOI: 10.5958/2249-7137.2021.00081.1

# ON SOME TYPICAL PROBLEMS TO BE SOLVED IN PRIMARY SCHOOLS 

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#### Abstract

One of the main requirements of school mathematics education in this article is the formation of an independent-minded creative thinker, a creative approach to the performance of educational tasks. The concept of "problem" is one of the most important tools in developing independent thinking of primary school students in mathematics. In math classes, students seek to analyze connections between subjects through problems. In particular, typical arithmetic problems play a special role in enhancing the student's logical thinking, creative activity, as well as expanding their free, independent thinking.


KEYWORDS: Problem, Arithmetic Problem, Complex Arithmetic Problem, Typical Arithmetic Problem, Mean Arithmetic Value, Sum, Subtraction, Multiple Ratio.

## INTRODUCTION

Long-term observations and school experience show that elementary school students have difficulty solving typical arithmetic problems. Even some elementary school teachers are no exception. Although there are some types of problems in elementary school math textbooks, most elementary school students make some mistakes when it comes to observing and fully analyzing such problems and looking for solutions.
It is not difficult to distinguish a number of problems from complex textual problems that are performed in the same sequence and solved by the same actions. Such issues can be said to be issues of the same kind. But complex problems with some important features have been adopted as typical arithmetic problems in the methodology course.
A distinctive feature of typical problems is that they are much more difficult than non-typical problems and require the use of special reasoning methods to solve them.

Below we think about some typical problems that can be solved in primary school, their specific important features, and ways to solve them.

Problems of finding the arithmetic mean.
In people's lives, terms such as "average", "average" are often used, for example, "average age of students in the classroom", "average score of children", "the average amount of money spent on purchases", "average height of students", Phrases such as "average temperature", "average speed", etc. can be evidence of our opinion. Let us interpret the concept of the arithmetic mean.

Definition: The arithmetic mean of several numbers (two or more) is the sum of these numbers divided by the number of digits. For example, the arithmetic mean of the numbers a1, a2, a3,
$\qquad$ an $(a 1+a 2+a 3+$ $\qquad$ .+ an) is equal to $n$. In particular, the arithmetic mean of the numbers $2,3,4,5,6$ is found as follows.

$$
(2+3+4+5+6): 5=20: 5=4
$$

Consider the following issue.
Issue 1 . The air temperature was measured every 3 hours during the day and the following data were obtained: $180,210,190,220,230,260,240,230$. Based on the data, determine the average amount of air temperature.

Given the problem conditions and the definition of the arithmetic mean, the average air temperature is found as follows:

$$
t=0
$$

Answer: The average air temperature is 220.
The work of preparing primary school students to find the arithmetic mean of several numbers provides a basis for solving such problems.

First, we prepare students from 1st grade onwards to learn how to multiply them by adding the same additives, adding different additives. Also, in Grade 2, students will be given the following tasks to study multiplication and division and consolidate them, which will prepare them to find the arithmetic mean.
Assignment 1 . Add the numbers $6,4,2$. Divide their sum by 3 . What number is formed?
Assignment 2. Divide the sum of the numbers 10 and 8 by 2.
Assignment 3. Find the sum of 4 numbers starting with 4 and increasing by 2. Divide the sum by 4. What number is formed?

The final assignment can be given in the last quarter of 2 nd grade, at the beginning of 3 rd grade. This task is adequate to the following problem: "What is the arithmetic mean of 4 numbers starting with four and increasing by 2 ? "

Of course, in the process of completing the above task 3, the student relies on the following knowledge, skills, and abilities:
b) Find the sum of 4 written numbers $(4,6,8,10),(4+6+8+10=28)$
c) Divide the result by $4(28: 4=7)$. Be able to show the result (7).

Assignment 4. Choose a number instead of a window so that the equation is correct: (10+): $2=8$
This task represents the arithmetic mean of the sum of two numbers and the problem model for finding the second additive according to a known 1 additive. It is possible to create multiple textual issues that fit this model. For example:
a) The 10 -line and multi-check notebooks were distributed to 2 groups of 8 . How many checkered notebooks are distributed?
b) Each of the 2 plates on the table has 8 fruits consisting of apples and pears. If 10 of these fruits are apples, how many are pears?
c) School children who went to plant seedlings were divided into two equal parts. In each group, 8 students planted seedlings. 10 of the students are boys and the rest are girls. How many girls planted seedlings?
g) The brothers were playing hide-and-seek. His brother is 10 years old. If their average age is 8 , how old is their brother?

By solving such problems, students acquire the skills to solve the arithmetic mean of several numbers and the appearance of some inverse problems. Encouraging fourth graders to solve the following problem requires them to think creatively.
Masala. The average score of 11 players on a football team is 20 . If they add up the coach's age, the average age is 22 years old. How old is the coach?

The reader can comment on this issue as follows:

1) Multiply 20 by 11 to find the sum of the youth of 11 players on a football team. $20 * 11=220$ (age)
2) 11 players and a coach in a football team together make $11+1=12$ (people).
3) Multiply 22 by 12 to find the combined age of 11 players and 1 coach from a football team. $22 * 12=264$ (age)
4) To determine the age of the coach, subtract 264 from 220.

264-220 = 44 (age)
Answer: The coach is 44 years old.
The concept of arithmetic mean plays an important role in solving the problem of finding the "weighted average value" and "average velocity". If such issues are taught in 5th grade, it is advisable to start preparations for them in grades 3-4. The student faces such issues in his lifestyle. In particular, the market learns that you need to address issues of medium weight when shopping.
Masala. 2 kg of sweet cakes worth 2,400 souls per kilogram and 3 kg of candies worth 2,800 souls per kilogram were purchased. How much did you pay for all the sweets?

The reader can complete this task quickly.
Solution of the problem: 1) $2400 * 2=4800$ (sum)
2) $2800 * 3=8400$ (sum)
3) $4800+8400=13200$ (sum)

Answer: 13,200 sum were paid for all sweets.
One more addition to this question is "How much does a kilogram of sweets cost?" if the question is addressed to students, the question remains a problematic question for the reader. Students will hear different answers: "We divide 13200 by 5 (that is, the mass of sweets)", "Add 2400 and 2800 sum, we divide by $2^{\prime \prime}$ and so on.

Students are explained that 1 of the answers given is correct. So, 13200: $(3+2)=13200: 5=$ 2640 (sum) - the average price of 1 kg of sweets.
It is a good idea to include students in Grade 4 after learning about speed, time, distance, or movement. Initially, it may be recommended that students be familiar with the problem of finding their average velocities in 2 situations when the distance (velocity) of an object is different in 1 hour. For example, when a pedestrian was walking from a village to a city, he first covered 3 km in 1 hour and 5 km in 2 hours. How fast did the pedestrian walk on average?

$$
(3+5): 2=4(\mathrm{~km} / \mathrm{h})
$$

A: Pedestrians walk at an average speed of $4 \mathrm{~km} / \mathrm{h}$.
It is recommended to gradually study the problem of finding the average velocity depending on the distances of the body at different speeds at the same time (e.g. 2 hours, 3 hours, 4 hours ...).

Masala. "The train was traveling at $80 \mathrm{~km} / \mathrm{h}$ for the first 2 hours and then at $100 \mathrm{~km} / \mathrm{h}$ for 2 hours. How many kilometers does train travel?" The issue is discussed and resolved by the students.

Solution: Method 1. 1) $80 * 2=160(\mathrm{~km})$ Method 2 1) $80+100=180(\mathrm{~km})$
2) $100 * 2=200(\mathrm{~km}) 2) 180 * 2=360(\mathrm{~km})$
3) $160+200=360(\mathrm{~km})$

Answer: The train traveled 360 km .
Now, if students are given the additional task "Find the average speed of the train", they can get different answers.
a) "We divide 360 by $2 " \mathrm{c}$ ) "We divide $(80+100)$ by 2 "
b) "We divide 360 by 4 " g) "We divide $(80+100)$ by 4 " and so on.

Given that the train travels in 2 situations at different speeds ( $80 \mathrm{~km} / \mathrm{h}$ and $100 \mathrm{~km} / \mathrm{h}$ ) and at the same time ( 2 hours), the sum of the speeds is divided by 2 , or the total distance ( 360 km ) is divided by time (4 hours). is given.

## Problems of finding two (or more) numbers according to their sum and difference)

Problem: Lola and Ali have a total of 9700 sum. Lola's money is 300 sum less than Ali's. How much money does each of them have?
We will solve the above problem by discussing it with the students.

- What are the students talking about?
- We are talking about Lola and Ali's money.
"How much money do Lola and Ali have together?"
- Yes
"How much?"
- 9700 sum
"What else is given?"
- Lola's money is 300 sum less than Ali's.
- What does the question require us to deny?
"How much money do Lola and Ali have?"
As a result of our observations, we note that most teachers find it difficult to discuss this type of issue. Because, continuing the question and answer in the form of the current discussion, the following: "How do we answer the question?", "How do we find it?" inappropriate questions such prevent the reader from understanding the specifics of a new type of problem that has not been mastered, leading to erroneous solutions; i.e., the reader may give the following answers. "Subtract 300 from 9700 " or "Add 300 to 9700 ". But he can’t justify why he chose these actions. It is as if he must do something about the two numbers given in the problem.

At this point, the teacher should give the following referral. That is, after the guiding questions and answers, "Students read the text of the question carefully again. Who has a lot of money? (Alida). Who has less money (Lola)? Conditionally, we denote the money in Lola by one section, and the money in Ali by another longer section, that is, we give a graphical condition to the problem: "


Since the money in Lola and Ali is 9700 sum, we define them together as 9700 sum. The amount of money in Lola is 300 sum less than in Ali. This model is an important tool in finding a solution to a problem. We will now continue the discussion of the issue.

- How much money would they both have if Lola had money like Alida?
- $(9700+300)$ sum
"Can you find out how much money Alida has now?"
- Yes
- How to divide the sum of 9700 and 300 numbers by 2
"Can you find out how much money Lola has?"
"Yeah, how about deducting 300 from Ali's money."
- So, how many cases will be solved?
-3 jobs (with first addition, second division, third multiplication)
We describe the solution to the problem as follows:

1) $9700+300=10000$ (sum)
2) $10000: 2=5000$ (sum)
3) $5000-300=4700$ (sum)

Answer: Alida has 5,000 sum and Lola has 4,700 sum.
Saying that this problem can be solved in two ways if the solution of Method 2 is required to be done by students independently, the students' independent thinking will increase. To do this, we express the graphical condition of the problem as follows:


1) How much money would both have if Ali had the same money as Lola?
$9700-300=9400$ (sum)
2) How many rubles did Lola have?

9400: $2=4700$ (sum)
3) How much money did Ali have?
$4700+300=5000$ (sum).
Answer: Lola has 4700 sum and Alida has 5000 sum.
It is important to draw students' attention to the fact that they solved the problem correctly, and in both methods it was found that Ali had 5,000 sum and Lola had 4,700 sum.

The next step is to add the sum of three numbers and the problems of finding these numbers according to the differences of the pairs of these numbers.
Masala. There are 62 apples in 3 slices. The apples in Division 2 are 8 more than the apples in Division 1 and 10 less than the apples in Division 3. How many apples are in each serving?


The text of this problem will be mastered by the students and we will create a graphical model consisting of three parts. Therefore, in Table 1, which is the smallest apple, we conditionally express the number of apples with the 1 st cut. Since there are 8 more apples in Section 2, we draw Section 2 as longer than Section 1. In Section 3, because there are 10 more apples than Section 2, Section 3 is longer than Section 2.
We will solve this problem in 3 ways.
Method 1: What would be the total number of apples when they were in subdivisions 2 and 3, as in the first subdivision?
$62-10-8-8=36$ (pieces)
2) How many apples are in the first serving?

36: $3=12$ (pieces)
3) How many apples are in the second division?
$12+8=20$ (pieces)
4) How many apples are in the third division?
$20+10=30$ (pieces)
Answer: 12, 20, 30.
Method 2: How many apples would there be on all three plates if there were apples in subdivisions 1 and 3 as in subdivision 2?

1) $62-10+8=60$ (pieces)
2) How many apples are in Division 2?

60: $3=20$ (pieces)
3) How many apples are in Division 1?
$20-8=12$ (pieces)
4) How many apples are there in Division 3?
$20+10=30$ (pieces)
Answer: 12, 20, 30
Method 3: 1) How many apples would there be in all three subdivisions if there were apples in subdivisions 1 and 2 as in subdivision 3?
$62+8+10+10=90$ (pieces)
2) How many apples are there in Division 3?

90: $3=30$ (pieces)
3) How many apples are in Division 2?
$30-10=20$ (pieces)
4) How many apples are in Division 1?
$20-8=12$ (pieces)
ANSWER: 12, 20, 30.
Consider the following issue.
A total of 912 saplings were planted by the second, third and fourth grade students of the school. 3 rd graders planted more than 30 seedlings than 2nd graders and 4th graders planted more than 27 seedlings than 3rd graders. How many bushes did each class plant in order to plant the city?
We give a brief condition of the matter.


To give the condition, we think as follows. Since the condition of the problem is that the 4th grader planted the most seedlings, then the 3rd grader planted the 3rd grader, and the 2 nd grader planted the least, we draw the cross-sections representing the seedlings planted by each grader.

Students know that this problem can be solved in 3 ways.
According to the previous question, the easiest way to solve the problem is "how many seedlings would the three classmates have planted together if the number of seedlings planted by the second and fourth graders were the same as in the third grade?" it is expedient to do so by seeking an answer to the question.
The graph shows that the total number of seedlings when second and fourth graders planted seedlings as third graders
(912 + 30-27).
Solution: 1) $912+30-77=915$ (pieces)
2) 915: $3=305$ (pieces) Number of seedlings planted by 3rd graders.
3) $305-30=275$ (pieces) Number of seedlings planted by 2 nd graders.
4) $305+27=332$ (pieces) Number of seedlings planted by 4th graders.

Answer 275,305,332.

Specific features of problems of the type "Find these numbers by the sum and difference of two (or more) numbers" are:

- the problem is always given the sum or difference of two or more numbers and it is required to find these numbers themselves.
- it will be convenient to graphically describe the brief condition of the problem.
- The solution begins with the equalization of conditionally accepted sections of arbitrary length.
- Conditionally accepted, the number of cuts of arbitrary length is equal to the number of unknowns.
- The more unknowns are involved in the issue, the more solutions the issue will have.

Problems of finding these numbers according to the sum (or difference) and multiplication of two numbers

This type of problem can be solved by elementary school students with interest. Consider the following issue.

Issue: Nadir and Talib picked 24 mushrooms. The number of rare mushrooms is 2 times more than the number of mushrooms collected by Talib. How many mushrooms did Nadir sweat? How many mushrooms did Talib pick?
To make this issue clear, let us first give a graphical model representing the short term of the problem. Since the number of rare mushrooms is 2 times longer, we denote the section 2 times longer than "a" by " v ". We denote the number by which they both picked 24 mushrooms.


We will solve the problem by discussing it with the students as follows.

- Do you know how many mushrooms Nadir picked?
- No, it's not
"How many mushrooms did Talib pick?"
- No, it is not known.
"How many mushrooms did they pick?"
- Yes. 24 ta
"Who picked a lot of mushrooms?"
- Rare.
- How many times did you pick mushrooms from Nadir Talib?
- 2 times.
"How many mushrooms did Nadir or Talib pick?" the question leads students to misjudge.
Some students think for themselves and divide 24 by 2 to find the number of mushrooms that Talib picked. This error leads to resolution.
Encouraging students to think correctly, the teacher says from the graphic model, "If we take the number of mushrooms picked by Tolib as 1 part (share), the number of mushrooms picked by Nadir will be 2 parts (parts) because it is 2 times more than the number picked by Talib." Then students will know how many parts (parts) of 24 picked mushrooms there are.
$1+2=3$ (part)
- Is it possible to find the number of mushrooms that Talib collected?
- Yes.
"How?"
- 24 by 3. 24: $3=8$ (pieces)
- Who picked 8 mushrooms?
- Tolib.
- How many mushrooms can Nadir pick?
- Yes, multiplying 8 by $28 \cdot 2=16$ (pieces)

The teacher tells them to make sure they have solved the problem correctly. Then the students check the problem.
$8+16=24$ (pieces) or 16: $8=2$ (times) these solutions represent that the problem was solved correctly.
Let us now consider introducing students to the problem of finding two numbers according to their difference and multiplication.

Problem: Geese in the meadow are 3 times less than ducks. If the ducks are more than 14 geese, how many geese and how many ducks are there in the meadow?

This problem is two unknown linear equations
This problem represents a system $\left.\begin{array}{c}a=3 b \\ a-b=14\end{array}\right\} \quad$ of two unknown linear equations (where a is the number of ducks in the meadow and $b$ is the number of geese).
This problem can be solved by discussing it with primary school students as follows:

- What are the students talking about?
- About geese and ducks in the meadow
- Is it known how many times the geese in the meadow are less than the ducks?
- Yes, 3 times
"What else is given?"
- It is known that ducks in the meadow are 14 more than geese.
- What does the issue require us to find?
- How many geese and how many ducks are in the pasture.

To find a solution to a problem, we first create a graphical condition (model) that represents the problem condition.


Since geese are 3 times smaller than ducks, we choose 1 section that represents the number of geese. The section that represents the number of ducks is 3 times longer than the number of geese, so this section should be 3 times longer than the first section. and denote it by 14.

Looking at this graphical model, we will continue to observe. As we can see from the graph, 14 represents two of these cross-sections representing the number of geese. So you can find the number of geese by dividing 14 by 2. When the number of geese is exact, the number of ducks is found. The problem is solved with 3 cases. (by multiplication, division and multiplication)
Solution: 1) 3-1 = 2 (part)
2) $14: 2=7$ (pieces)
3) $7 \cdot 3=21$ (pieces

Answer: 7 geese, 21 ducks.
To check the correctness of the solution of the problem, it is necessary to subtract 21 from 7 .

## 21-7 = 14 (ta)

The peculiarities of the problem of "finding two numbers by their sum (or difference) and multiplicity" are as follows:

- The problem gives the sum (or difference) of two numbers or quantities and their multiple, it is necessary to find the number or quantity itself.
- In order to clarify the text of the problem and find a solution, a graphical condition (problem model) is created.

When creating a graphical condition, the smallest number or quantity is selected as a fraction (contribution) and conditionally determined by a cross section of a certain length. From the text of the problem, the length of the second section is determined by considering the magnitude of the second number or quantity multiplied by the ratio.

- Two or more unknown numbers or quantities are involved in the matter.
- The solution of the problem begins with the calculation of the number of equal parts. If the sum and multiplication ratios of two numbers or quantities are given in the text of the problem, the number of parts is added. If the difference and multiplication ratio of two numbers or quantities is given in the text of the problem, the number of parts is subtracted.
- The problem will always have a unique solution.
- There may be other types of issues in the case.

Problems of finding the unknown by the difference of two quantities
A distinctive feature of this type of issue is:
a) no more than two unknowns are involved in the matter.
b) they involve finding two unknown quantities by their difference.
c) the content of the issue is clarified by the presence of words such as "same", "so", "same as" and so on.
g) The solution of the problem always begins with the operation of multiplication.

This type of issue is very common in elementary school textbooks. Short terms of this type of issue can often be given in tabular form or in the form of a short note.
Let's look at the following problem that can be solved in elementary grades
Issue 1. One tractor worked 60 hours a week and the other 55 hours. The second tractor consumed 35 liters less fuel at the same rate than the first tractor. How many liters of fuel does each tractor consume per week?

Let us give the condition of the matter in tabular form.

|  | Working time | Normal | Total fuel |
| :--- | :--- | :--- | :--- |
| 1-t. | $\mathbf{6 0}$ hours | Same | ? |
| 2-t. | $\mathbf{5 5}$ hours |  | ?, 351 less |

Let's show the solution note by asking questions.

1) How many hours did the second tractor work less than the first tractor?

60-55 = 5 (hours)
2) How many liters of fuel did each tractor consume per hour?

35: $5=7$ (1)
3) How many liters of fuel did the first tractor consume in a week?
$7 \cdot 60=420(1)$
4) How many liters of fuel did the second tractor consume in a week?
$7 \cdot 55=385$ (1)
Answer: the first tractor is 420 liters, the second tractor is 385 liters.
Issue 2. There were an equal number of mandarin trees in the two fields. An average of 420 mandarins were obtained from each tree in the first field, and 350 mandarins from each tree in the second field. As a result, more than 9,800 units were produced from the first to the second field. All mandarins were divided into varieties according to their size. The average number of mandarins was 2 times the number of small mandarins and 20,700 more than large mandarins. How many large mandarins are picked?

The condition of this matter consists of 2 parts. The contents of Part 1 relate to type IV. The content of Part 2 belongs to type III. First we do the type IV part.

Masala. The brief condition of Part 1 may be as follows.
Number of trees per 1 tree Total number of mandarins
I 420 pieces Equal ?, 9800 more
II 350 pieces?
Solve. We will explain.

1. $420-350=70$ (pieces) is the difference of mandarins taken from each tree.
2. 9800: $70=140$ (bush) - number of trees.
3. $420 \cdot 140=58800$ (pieces) - The number of mandarins taken from area I.
4. $350 \cdot 140=49000$ (pieces) - the number of mandarins taken from area II.
5. $58800+49000=107800$ (pieces) - the number of mandarins taken from two fields.

We now turn to the type III part of this issue. Let's make a graphical condition.
We will continue to resolve the issue.

6. $107800+20700=128500$ (pieces)
7. 128500: $5=25700$ (pieces) is the number of small mandarins
8. $25700 * 2=51400$ (pieces) - the number of medium mandarins
9. $51400-20700=30700$ (pieces) - number of large mandarins.

Answer: 30700 pcs.
Among the typical problems mentioned above are also the problems of assumption and solution of the calculation of surfaces in motion in terms of time to work together.
Solving typical textual problems develops students' independent thinking skills and increases children's desire to solve problems.

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