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WORKING ON COLLABORATIVE PROBLEMS IN ELEMENTARY MATH LESSONS

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ABOUT ARTICLE

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Abstract: Problem is a complex category, which does not have a single definition accepted by everyone, but representatives of different fields have interpreted the concept of problem in different ways depending on their orientations. This article describes the characteristics of arithmetical problems, the methods and means of teaching to solve problems related to working together in primary school. Specific cases of developing students' problem-solving skills by discussing and solving any arithmetical problems are highlighted.

INTRODUCTION

It is not difficult to distinguish a series of problems that are performed in the same sequence and solved by the same actions from complex text problems. Such issues can be said to be one type of issues. But complex problems with some important features were accepted as typical arithmetical problems in the methodology course.

A characteristic feature of typical problems is that they are much more difficult than non-typical problems and it is necessary to use special reasoning methods to solve them.

We will discuss below the methods of solving typical arithmetic problems of joint solution.

The content of the issues related to this type is different.

a) when a number of people, crews or work tools (tractor, excavator, bulldozer) perform a certain work separately, they are told how long it will take to complete the work, and when they work together, they are asked to find the deadline for the completion of the work;

b) when several people, crews or work tools work together, a deadline is given for the completion of a certain job, and one of them is asked to find the time spent on this job when working alone.);

c) when a number of workers or crews start a certain job at the same time, and after a few days, some of them are transferred to another job, it is asked how many days the entire job or the rest of the job will be completed;

g) when a number of workers or crews start a certain work at the same time, and after a few days, when new assistants join them, they are asked to complete the whole work or the remaining part of the work in how many days, etc.

To solve such problems, it is necessary to start by finding the time limit for execution alone, if it is given in hours, it is one hour, if it is given in days, it is one day. Issues related to joint work can be found in elementary school textbooks. But in the process of solving problems of this type, students can often be expected to make some mistakes.

Consider the following issue.

Problem: 150 bicycles need to be repaired. The master does this work in 10 days, and the apprentice in 15 days. If they work together, how many days will it take them to do it?

A brief statement of the problem:

Master - in 10 days

150 bikes -? in the day

Apprentice - 15 days

When this problem is given for solving, the following solution options are shown.

Option 1: 1) 10+15=25 (per day)

2) 150:25=6 (days)

Option 2: 150: (10+15)=150:25=6(days)

Option 3:

1) 150:10=15 (items)

2) 150:15=10(s)

3) 15+10=25 (each)

4) 150:25=6 (days)

Answer: If the master and the apprentice work together, they will complete the work in 6 days.

When analyzing these solution options, every time the result is 6 in all three solution options, solution options 1 and 2 are error solutions.

If you ask the student after each action, "What did you find?" when asked the question, they cannot explain the results of the action. Indeed, "What did you get by adding 10 to 15?" ” or, “What did you find by dividing 150 by 25 days?” We cannot find answers to such questions as the solution to the problem. Therefore, option 3 is the correct solution to this problem.

We divide 150 by 10 and find out how many bicycles the master repaired in one day. We divide 150 by 15 and find out how many bicycles the student repaired in one day. By adding 10 to 15, we find how many bicycles the master and apprentice repaired in one day, and divide 150 by 25. It is found that the master and apprentice together repaired 150 bicycles in how many days.

Another great feature of this problem is that if you put 300, 450, 1800 and other numbers instead of 150, the problem does not change. The problem can be stated as a problem in the following adequate form.

Matter. A master can do a job in 10 days, an apprentice in 15 days. If they work together, how many days will it take them to do it?

This problem is a problem to be solved by students of the 4th grade.

Let's look at the following issues. There are 3 trucks with different carrying capacity. When each car transports the cargo in the base by itself: the first car can transport it in 10 hours, the second car in 12

hours and the third car in 15 hours. How many hours will it take to carry this load when the machine works together? Let's state the problem:

1 - avt alone - at 10 o'clock

2 - avt alone - how many hours together in 12 hours?

3 - avt alone - at 15 hours

1) What part of the load does the first car transport alone in one hour?

1 : 10 = (part)

2) What part of the load can the second car alone transport in one hour?

1 : 12 = (part)

3) What part of the load does the third car transport alone in one hour?

1 : 15 = (part)

4) What fraction of the load will the three cars transport in one hour?

+ + = (part)

5) In how many hours will the three cars together transport the entire load?

1 : = 4 (hours)

Answer: 4 hours.

Issue 2. One working assignment had to be completed in 12 days. 4 days after he started work, another worker came to help him and the whole work was completed in 8 days. When the second worker worked alone, he could finish the whole job in a few days

After discussing the issue, we present the solution in the following sequence of questions.

1) What part of the work can the first worker do in a day?

$$1 : 12 = \frac{1}{12} \text{ (part)}$$

2) What part of the work did the first worker do in $4\frac{1}{3}$ days?

$$4\frac{1}{3} * \frac{1}{12} = \frac{13}{36} \text{(part)}$$

3) How much work is left?

$$1 - \frac{13}{36} = \frac{23}{36} \text{ (part)}$$

4) How many days did both workers work together?

$$8 - 4\frac{1}{3} = 3\frac{2}{3} \text{ (days)}$$

5) What part of the work did the first worker do in $3\frac{2}{3}$ days?

$$3\frac{2}{3} * \frac{1}{12} = \frac{11}{36} \text{ (part)}$$

6) What part of the work did the second worker do in $3\frac{2}{3}$ days?

$$\frac{23}{36} - \frac{11}{36} = \frac{1}{3} \text{ (part)}$$

7) How many days can the second worker do the work alone?

$$3\frac{2}{3} : \frac{1}{3} = 11 \text{(day)}$$

Answer: 11 days.

Problem: Bikbayeva N, Grifanova K 4th grade Mathematics. Page 112 of 2020. Issue 4

Two master bricklayers worked together to collect 119,920 bricks. The first master worked for 17 days and collected 2,860 bricks every day. The second master picked the remaining bricks in 23 days. How many bricks did the second master pick every day?

When the reader analyzes this issue, it is known that two masters worked together to pick 119920 bricks, the first master worked for 17 days picking 2860 bricks every day, and the second master picked 23 bricks for the remaining bricks. should know that the master is required to find the number of bricks he picks in one day. The problem is first analyzed and a solution is sought based on a short condition. Although the problem is about working together, the problem also focuses on performing arithmetic operations on multi-digit numbers.

The period of preparation for this type of problems begins in 2-3 grades, and in the 4th grade textbook, we often meet problems of this type. By teaching them to solve problems of this type, it is considered as a basis for elementary school students to master high-grade mathematics in depth.

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