INTERNATIONAL JOURNAL ON ECONOMICS, FINANCE AND SUSTAINABLE DEVELOPMENT

IJEFSD

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The Concept and Content of the Tenth Cause Methodology of Four Aplications in Decimals Fraction

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A B S T R A C T

The article describes the teaching methods and theories that can be used to increase the effectiveness of education in secondary schools, to teach decimals.

A R T I C L E I N F O

Article history:

Received 29 Oct 2021

Received in revised form 26 Nov 2021

Accepted 22 Dec 2021

Keywords: efficiency, teaching methods, fractions, simple fractions and decimals, fraction properties, operations on fractions.

The goals, objectives and content of education at different levels of education are always determined by the current and future needs of society. Despite the global and national changes taking place in the scientific, technical, socio-cultural spheres, one of the priorities of higher education is the development of intellectually and physically developed people with a high level of spiritual and moral culture. is the training of a future specialist with the ability for professional growth and personal development.

In modern education, the main task of the teacher is not to provide students with ready-made knowledge, but to help them acquire knowledge independently. To do this, it is necessary to organize the educational process at a level that allows students to fully demonstrate their abilities and potential and devote all their efforts to learning.

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Peer review under responsibility of Emil Kaburuan.

For these purposes, in this article we will give an idea of how to teach examples and solutions to problems on decimal fractions in the mathematics curriculum in secondary schools, and the theoretical significance of the topic.

It is known that the appearance of fractions is the transition from one unit of magnitude to another, the fractional denominator indicates the number of units of a given unit of magnitude. At present, the system of international units is used in almost all countries. Because the system uses a decimal number system, new units of quantities are created by subtracting and multiplying the given by 10, 100, 1000, and so on.

For example, 1 dm = 10 cm; 1 cm = 100 mm;

1 km = 1000 m = 10000 dm;

1 kg = 1000 g and so on.

Therefore, in practice, fractions with denominators of 10 (m, n are natural numbers) are very important. These fractions are called decimal fractions.

The concept of decimal fraction was introduced in the XV century by the scientist from Samarkand Ali Kushchi. He first used the concept of decimals in his 1427 book "The key to the art of accounting", "The Key to Arithmetic".

The definition of a decimal is such:. A fraction that denominator is ten or its degrees is called a decimal fraction.

The following definition of decimals is accepted:

$$\frac{1}{10} = 0{,}1; \quad \frac{1}{100} = 0{,}01; \quad \frac{1}{1000} = 0{,}001; \quad \frac{3}{10} = 0{,}3; \quad \frac{3}{1000} = 0{,}003; \quad 2{,}15 = 2\frac{15}{100},\ldots$$

When decimals are written without denominators, the number in the first cell to the right of the comma is one tenth, and in the second cell the number is one hundred, and so on. For example, in 6,732 decimal places, the numbers after the comma can be expressed as a fraction, depending on their position: $\frac{7}{10}$; $\frac{3}{100}$; $\frac{2}{1000}$;

Unlike decimal fractions, ordinary fractions are called following visible fractions: mn . Let's define the meaning of a number in decimal form. .

We take the fraction 4362102 and make the following form changes:

4362102=4·103+3·102+6·10+2102=4·10+3+610+2102

The sum is the notation for the number 43, and the sum 610+2102 is the notation for the fractional part of the number 4362102. It is accepted to write such a fractional part without a denominator, in which the fractional part is separated from the whole part by a comma: 4362102=43,62.

Algorithms for operations on decimals.

Algorithm for adding and subtracting two decimal places:

1) in two decimal fractions the number of decimal places after the comma should be equal, if in one of the decimal fractions the number of decimal places is less, it is equal to writing a number of zeros to the right;

2) the resulting natural numbers are added (subtracted) by dropping the commas in the generated decimal fraction;

3) In the resulting sum (subtraction), the decimal place should be separated by as many decimal places as there are more decimal places in the addition (decreasing and divisible).

For example, add and subtract 3,12 and 2,1536 decimals.

a) 3.12 + 2.1536 = 3.1200 + 2.1536 = 5.2736.

b) 3.12 - 2.1536 = 3.1200 - 2.1536 = 0.9664.

Before explaining this topic, the teacher should show students the concept of addition and subtraction of simple fractions with different denominators to common denominators with examples, and then the theory of addition and subtraction of decimal fractions. and provide practical knowledge.

Rule. To add decimal fractions, the same rooms are joined together as whole numbers, and the whole part is separated by bringing the sum to the bottom of the comma in the fractions.

For example:

$$\begin{array}{r} 25{,}382 \\ +\quad 7{,}200 \\ \hline 32{,}582 \end{array}$$

Rule. To subtract decimals, underline the denominator to the decimal point, subtract the numbers with the same place value, and then separate the whole part of the difference with a comma.

For example.

$$1)\ \begin{array}{r} 14{,}273 \\ -\ 5{,}040 \\ \hline 9{,}233 \end{array} \qquad 2)\ \begin{array}{r} 27{,}100 \\ -\ 3{,}236 \\ \hline 23{,}864 \end{array} \qquad 3)\ 27{,}1-3{,}235=?$$

In the process of dividing decimals can be: the number of decimal places in the denominator is greater than the number of decimal places in the denominator, the number of decimal places in the declining and divisible decimals is the same, subtracting the decimal fraction from the whole number, multiply The teacher should give examples of each of these cases.

Algorithm for multiplying decimals:

1) commas in two decimal places are omitted;

2) the resulting two natural numbers are multiplied by the rule of multiplication of natural numbers;

3) From right to left of the natural number formed in the product, the number of digits after the comma in the two-digit fraction is counted and put a comma.

For example, $2.15 \cdot 3.17 = 6.8155$.

Multiplication of decimal fractions should be explained on the basis of the rule of multiplication of simple fractions, because students know the rule of converting decimals to simple fractions.

Example:

$$3{,}2 \cdot 0{,}12 = 3\frac{2}{10} \cdot \frac{12}{100} = \frac{32}{10} \cdot \frac{12}{100} = \frac{32 \cdot 12}{10 \cdot 100} = \frac{384}{1000} = 0{,}384$$

Explain to the students that the more zeros there are in the denominator of a multiple fraction, the more fractional space there will be when you convert it to a decimal fraction written without denominators.

1) $3{,}2 \cdot 0{,}12 = \frac{384}{1000} = 0{,}384$

2) $2{,}7 \cdot 1{,}3 = 2\frac{7}{10} \cdot 1\frac{3}{10} = \frac{27}{10} \cdot \frac{13}{10} = \frac{351}{10 \cdot 10} = \frac{351}{100} = 3{,}51$

The following rules are explained on the basis of the considered examples.

Rule 1. In order to multiply decimals by each other, multiply their pictures by their pictures and their denominators by their denominators, and the multiplier and the multiplier divide the number of rooms in the multiplication by the total number of fractional rooms. (This refers to a decimal fraction written in the form of a simple fraction.)

For example, $3{,}4 \cdot 0{,}25 = 3\frac{4}{10} \cdot \frac{25}{100} = \frac{34}{10} \cdot \frac{25}{100} = 0{,}85$

Rule 2. To multiply decimals by each other, multiply them as integers, ignoring their commas. separated by a comma.

For example: 1) 3,021 · 2,51 = 3021 · 251 = 758271 = 7,58271

2) 7,124 · 3,213 = 7124 · 3213 = 22889412 = 22,889412

Algorithm for dividing two decimal places:

1) the number of digits after the comma of two decimal places is equal, if one of them has a small number of digits, the last digit of the decimal place is filled with zeros;

2) the commas of the resulting decimal fractions are omitted;

3) is divided according to the rule of division of two natural numbers.

For example, 40,625: 12.5 = 40625: 12500 = 3.25

Arithmetic operations on rational numbers with negative and different signs are performed as operations on whole numbers. Consideration of such algorithms is given to students as independent work.

The following three cases are considered in the division of decimals:

1) Divide a decimal by an integer. Dividing a decimal fraction by an integer is done in the same way as dividing an integer by dividing the remainder into smaller and smaller fractions.

For example, 0.6: 4 = 0.60: 4 = 0.15.

Rule. In order to divide decimal fractions into whole numbers, if the whole part reaches the divisor, it is enough to continue the whole fraction until the room changes, and then to put a comma in the division.

Example: 25,232: 4 = 25232: 4000 = 6,308

In the process of explaining the above examples and rules, the teacher should repeat to the students the definition of the division operation and the rules for its implementation.

2) Divide the whole number into decimal fractions. The teacher should explain this to the students with an example. For example: 51: 0.17 =?

This example solves a simple fraction rule.

Example: $$51:0{,}17=51:\frac{17}{100}=(51\cdot 100):17=5100:17=300$$

Based on these considerations, the following rule can be expressed.

Rule. To divide an integer into decimal fractions, you must convert the decimal fraction in the divisor to an integer. To do this, the comma is moved to the end of the divisor, and the more rooms moved, the more zeros are placed to the right of the divisor, and the whole number is divided as an integer.

Example: 351: 2.7 = 3510: 27 = 130 25: 6.25 = 2500: 625 = 4

3) Divide a decimal by a decimal. In this case, too, the teacher should repeat to students the general rule of dividing fractions into fractions, and then show decimals as simple fractions as a method of dividing fractions.

For example: $$8{,}51:3{,}7=\frac{851}{100}:\frac{37}{10}=\frac{851\cdot 10}{100\cdot 37}=\frac{851}{10}:37=85{,}1:37=2{,}3$$

This example can also be solved as follows:

$$8{,}51:3{,}7=8{,}51:\frac{37}{10}=(8{,}51\cdot 10):37=85{,}1:37=2{,}3$$

From the above examples it can be seen that in order to divide a decimal by a decimal, we ask the comma in the divisor and the comma in the divisor as many rooms to the right, and the resulting divisor becomes a whole number.

As a result, the division does not change because the divisor and the divisor increase at the same time.

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