Decimals II

Dear students. Last lesson we talked about Decimals. We know how to convert decimal fractions to decimals. But not only decimal fractions can be converted to decimals. If the denominator of fraction isn't any power of ten can be conversion made by division. If we want convert any fraction to decimal, we have to divide the numerator of this fraction by its denominator.

Examples I

$4/5 = 4.0 : 5 = 0{,}8$

$5/8 = 5.000 : 8 = 0.625$

20

40

0

These divisions quickly finish without remainder. Decimals, which we get, are called the finite decimals. They have finite number of digits to the right of the decimal point.

Examples II

$1/3 = 1.000 : 3 = 0.333\ldots = 0.\overline{3}$

10

10

1

$1/11 = 1.000000 : 11 = 0.090909\ldots = 0.\overline{09}$

100

100

1

$5/7 = 5 : 7 = 0.714285714285\ldots = 0.\overline{714285}$

These divisions never end without remainder. Even the remainders are repeated again and again. Decimals, which come into being by these divisions, contain some

sequence of repeating digits. Such decimals are infinite and we call them the repeating decimals.

Besides finite decimals and repeating decimals there are infinite decimals without repeating sequence of digits.

Examples III

$\sqrt{2}$ = 1.414213562373…

π = 3.141592653589…

This kind of numbers is called irrational numbers, because there are no fractions, which represent these numbers.

The rational numbers and the irrational numbers together make up the set of real numbers.

But how to count with infinite decimals? How to add or multiply numbers which have infinite number of digits? We have to round them

π = 3.141592653589… = 3.1 3.1 is π rounded to tenths

$\sqrt{2}$ = 1.414213562373… = 1.41 1.41 is $\sqrt{2}$ rounded to hundredths