

Perform operations with multi-digit whole numbers and with decimals to hundredths (Standards 5.NBT.5–7).

Standard 5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. In this standard, dividing decimals is limited to a whole number dividend with a decimal divisor or a decimal dividend with a whole number divisor. Compare the value of the quotient on the basis of the values of the dividend and divisor.

Key Elements:

Within this standard, students are using the knowledge and strategies they already have practiced, but are adding the element of the decimal point and values less than 1. Because the expectations for decimals are limited to thousandths and expectations for factors are limited to hundredths at this grade level, students will multiply tenths with tenths and tenths with hundredths, but they need not multiply hundredths with hundredths.

This standard can be especially difficult to grasp without the understanding of how values increase and decrease depending on the digit's location in the number. Multiplying by 10 once, shifts every digit one place to the right in the product (the product is ten times as large) because in the base-ten system the value of each place is 10 times the value of the place to its right. So multiplying by 10 four times shifts every digit 4 places to the right. This knowledge can be used to apply to solving problems using exponents, which are introduced in 5th Grade. Students need to know that the digit is increasing in value and they are not merely "moving the decimal" which is a common shortcut.

(It may be useful to note that many of the previous skills from the former grades are expected and if they are having challenges some of those skills should be reworked.)

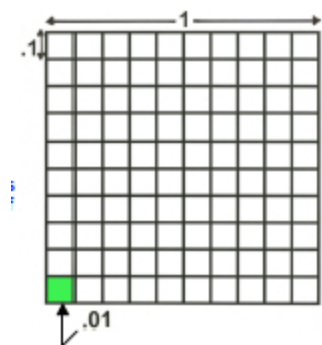
When you multiply by 0.1, the number get 1/10 as big. The digits shift one place to the right.
When you multiply by 0.01, the number gets 1/100 as big. The digits shift 2 places to the right.

When dividing with decimals, students can view 7 divided 0.1 as asking how many tenths are in 7. Because it takes 10 tenths make 1, it takes 7 times as many tenths to make 7, so 7 divided by 0.1= 7 times 10= 70. In other words, 7 divided by 0.1 is the same as 70 divided 1. So dividing by 0.1 moves the number 7 one place to the left, the quotient is ten times as big as the dividend. When multiplying or dividing with decimals remember these rules: when you multiply by a decimal less that one, you product will be lesser value. When you divide by a decimal less than 1, your quotient will be a greater than value.

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It is important to show students that a whole number (16) can also be written as a decimal (16.0). These numbers have the same value, only one is written as an actual decimal number.

Multiplication Models



If each large square represents 1, that is, has an area of 1 square unit. Each small square represents .01 and each row or column represents 0.1 because each large square contains 100 small squares.