Dimensions Math Grade 4 Chapter 14 Multiplication and Division of Decimals

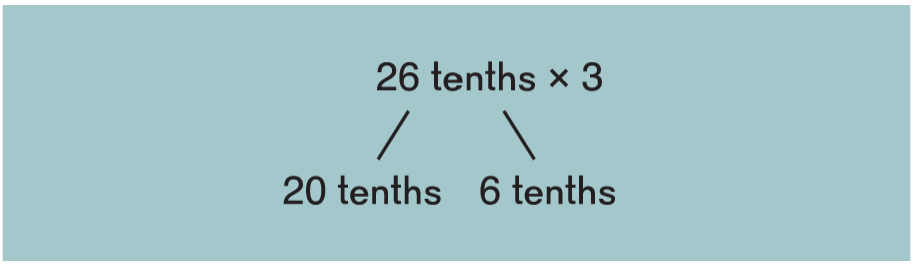
Home Connection

Students have learned both mental math strategies and standard algorithms for multiplication and division of whole numbers. In this chapter students will build on those strategies using decimal numbers. Students have learned through the commutative property that the order in which numbers are multiplied does not affect the product. However, for ease of understanding, the multiplier (number in each group) will come first in the expression, and the multiplicand (number of groups) will be second. So, 0.64 (multiplier) x 3 (multiplicand) can be thought of as 0.64 + 0.64 + 0.64.

Mental Math for Multiplication

The same mental math strategies used for whole number multiplication can also be used for multiplication of a decimal by a whole number. Multiples of ones, tenths, and hundredths can be solved by thinking of simple computations.

For example, 2.6 x 3 be thought of as 26 tenths multiplied by 3.



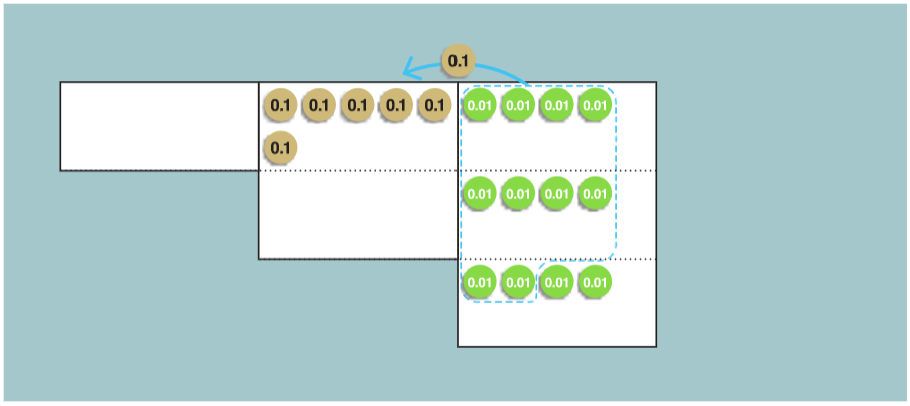
26 tenths x 3= 60 tenths + 18 tenths = 78 tenths = 7.8

Standard Multiplication Algorithm

In the first part of the chapter, students will multiply a decimal number by a whole number. Students will use place-value discs in class to help them see the algorithm. There is an example below of what using discs to show the standard algorithm will look like.

Example: 0.64 x 3

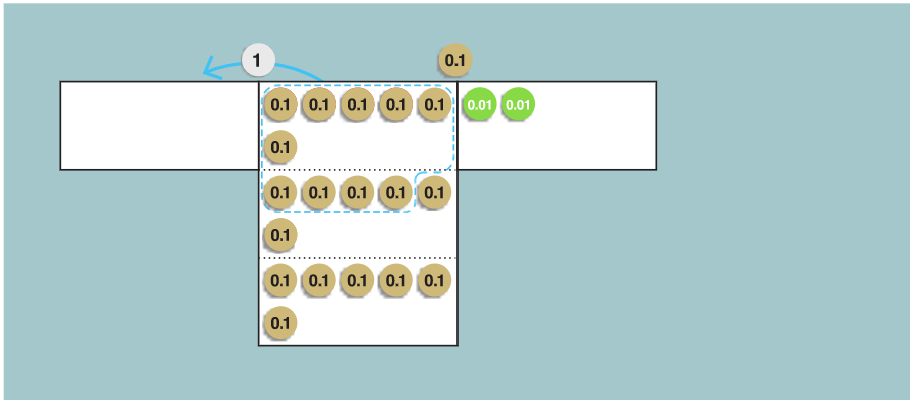
Multiply the hundredths by 3 and regroup:



4 hundredths x 3 = 12 hundredths

12 hundredths = 1 tenth and 2 hundredths

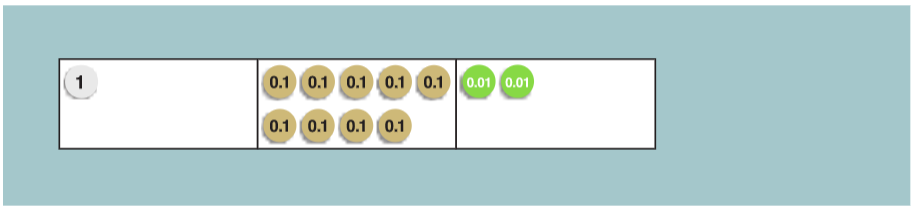
Multiply the tenths by 3 and regroup:



6 tenths x 3 = 18 tenths

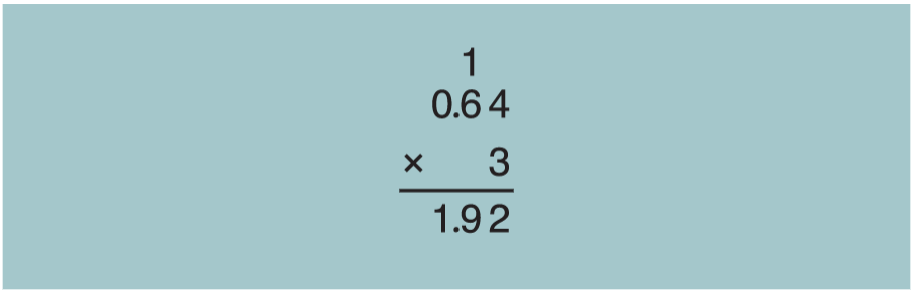
Add the regrouped tenths:

18 tenths + 1 tenths= 1 one and 9 tenths



0.64 x 3 = 1.92

Using place-value discs with decimals helps students find the product with the vertical algorithm. Here is what the standard algorithm looks like just using numbers:



The decimal point is always between the ones and the tenths.

**Your student may feel comfortable using the standard algorithm with just the numbers. If you feel that your student needs more support, you may choose to print out place value discs on our parent resource page under printable resources. Click Here to be taken to that page.

Mental Math for Division

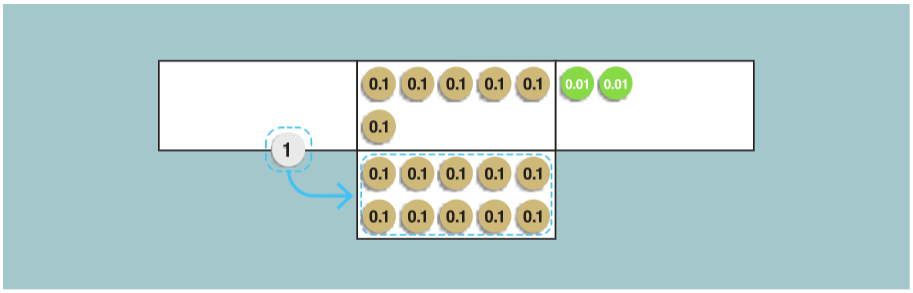
Mental math strategies used for whole number divisions can also be used for decimal division. For example: 4.8 ÷ 6 can be thought of as 48 tenths ÷ 6. 48 tenths ÷ 6 = 8 tenths = 0.8

Standard Division Algorithm

Students will use place value discs in class to see the similarity to the standard algorithm for dividing whole numbers. The algorithm is introduced with problems that many students can solve mentally.

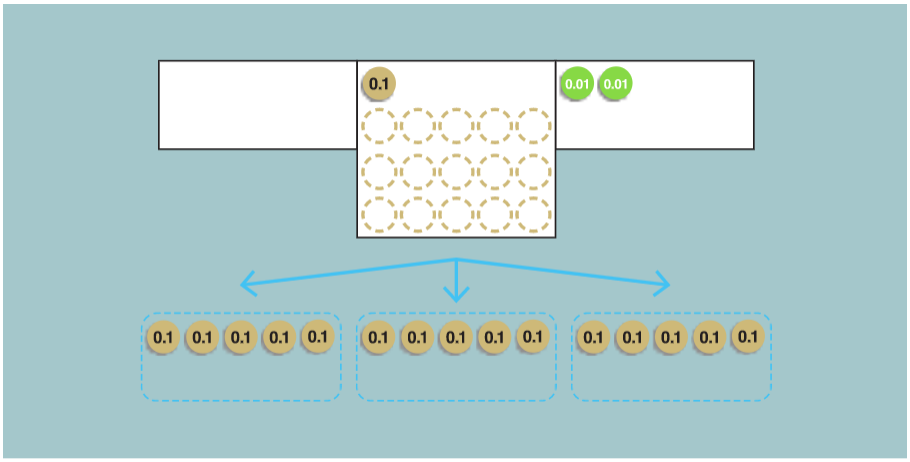
Example: 1.62 ÷ 3

Divide the ones by 3. We cannot divide 1 one disc into 3 equal groups. Regroup the 1 one disc as 10 tenths discs.



There are now 16 tenths discs to divide into 3 groups.

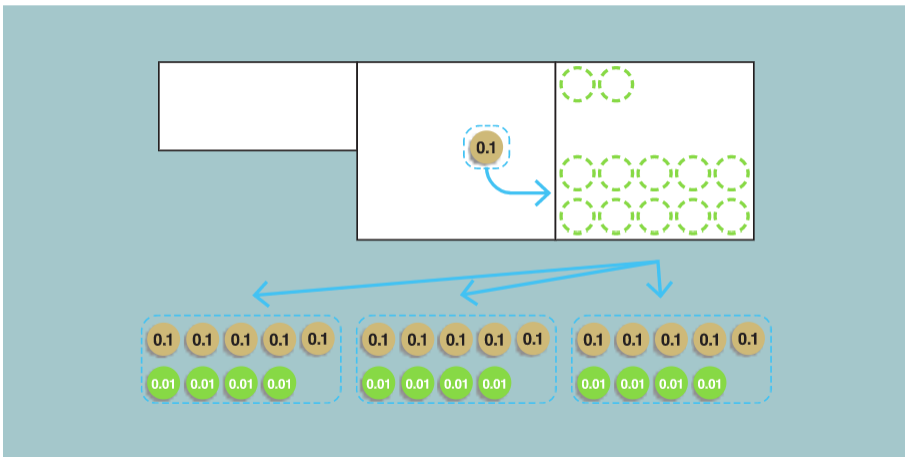
Divide those discs by 3:



16 tenths ÷ 3 = 5 tenths and 1 tenth remaining.

We cannot divide that remaining 1 tenth disc into 3 groups. We must regroup that 1 tenth into 10 hundredths discs. There are now 12 hundredths to divide into 3 groups.

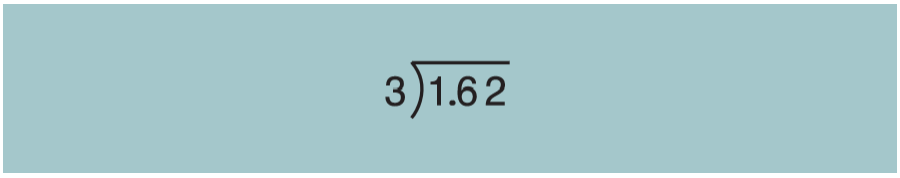
Divide the hundredths by 3:



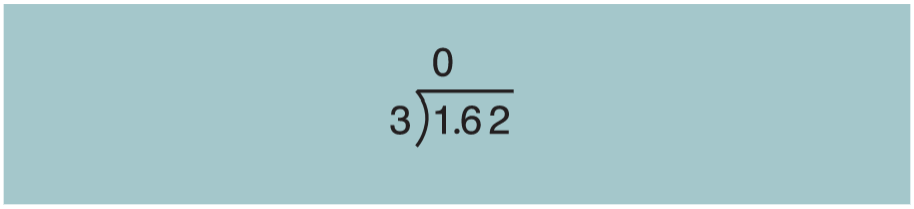
Students can easily see that there are 0 ones, 5 tenths, and 4 hundredths in each of the 3 groups.

1.62 ÷ 3 = 0.54

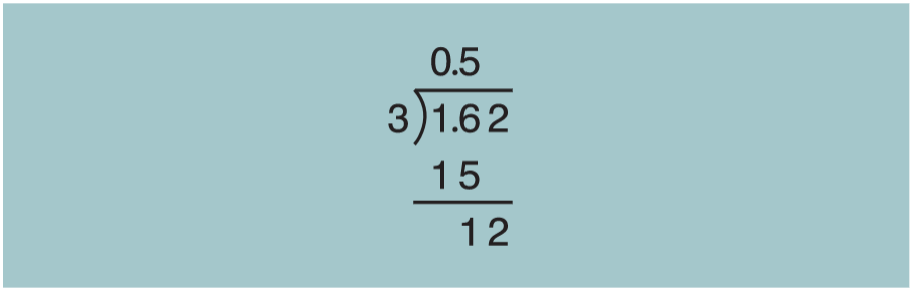
Let’s tie this to the standard long division algorithm:



Divide the greatest place value, in this case, the ones. Regroup 1 one as 10 tenths. There are now 16 tenths. Record a 0 in the ones place in the quotient for 0 ones.

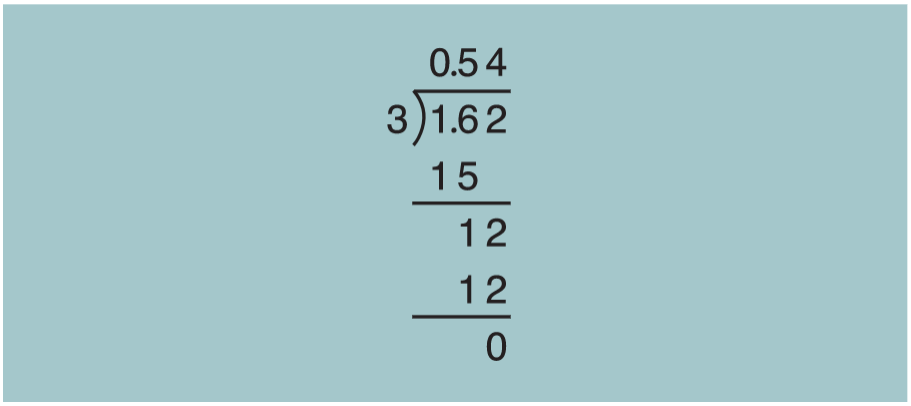


Divide the tenths by 3: 16 tenths ÷ 3 = 5 tenths and 1 tenth remaining. Record a decimal point and a 5 in the tenths place in the quotient. Regroup 1 tenth as 10 hundredths. There are now 12 hundredths.



Place a 12 in the algorithm, representing 12 hundredths.

Divide the hundredths by 3: 12 hundredths ÷ 3 = 4 hundredths. Record 4 in the hundredths place in the quotient. 1.62 ÷ 3 = 0.54



What Can We Do At Home?

Mental Math Decimal Duel

Materials:

Deck of cards with Aces counting as 1, and all 10 cards and face cards removed.

2 sheets of paper with boxes drawn on it, that looks like the example below.

Players take turns drawing cards until they each have twelve cards. They then fill up the twelve boxes in the scoring sheet with the numbers on their cards. Spaces can be filled in in any order. All numbers on each card must be used and used only once. Once players have filled out their scoring sheets, they complete the multiplication equations (using mental math) and add the four products together.

The player with the greatest sum is the winner.