

Accessible Algorithms for Multiplication

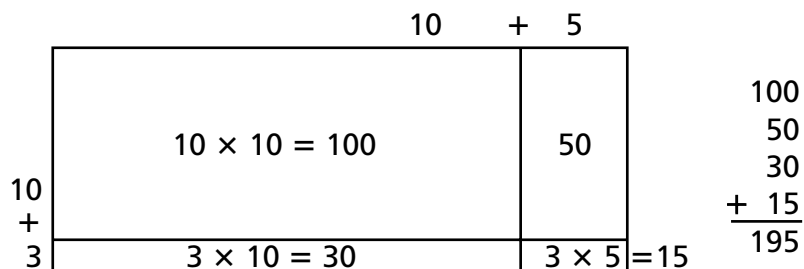
For multi-digit multiplication, first introduce the Rectangle Sections Method presented below. Less advanced students may continue to use the Rectangle Sections Method to organize their multiplying for quite some time, while many students should be able to move towards the Numerical Method that follows. Support students' use of these accessible algorithms whenever they are working on multi-digit multiplication.

Rectangle Sections Method for Multiplication

Use with *Houghton Mifflin Math*, Ch 6, Lessons 6–7; Ch 7, Lessons 4, 6, 7.

As an alternative to using manipulatives or quantity drawings to model multiplication, students may employ area drawings. The model shows each place-value product as a rectangle section. Adding the areas of the sections is known as the Rectangle Sections Method..

Rectangle Sections Method for $13 \times 15 = ?$



Expanded Notation Method

Use with *Houghton Mifflin Math Ch 3, Lesson 7*

Students can use the Expanded Notation Method to multiply from left-to-right or right-to-left.

$$\begin{array}{r}
 67 = 60 + 7 \\
 \times 43 = 40 + 3 \\
 \hline
 40 \times 7 = 280 \\
 40 \times 60 = 2,400 \\
 3 \times 7 = 21 \\
 3 \times 60 = 180 \\
 \hline
 2,881
 \end{array}$$

Algebraic Notation Method

Use with *Houghton Mifflin Math, Ch 3, Lesson 7*.

For more-advanced students, the Algebraic Notation Method can be used in place of the Expanded Notation Method.

$$(60 + 7)(40 + 3) = 180 + 280 + 2,400 + 21 = 2,881$$

Short-Cut (Common) Method

Use with *Houghton Mifflin Math, Ch 3, Lesson 7*.

The Short-Cut Method is the most common method, and it is conceptually difficult to understand when students are first learning multiplication. Students can progress to this method from the Expanded Notation Method by collapsing sums.

Step 1	Step 2	Step 3	Step 4	Step 5
$ \begin{array}{r} 2 \\ 67 \\ \times 43 \\ \hline 1 \end{array} $	$ \begin{array}{r} 2 \\ 67 \\ \times 43 \\ \hline 201 \end{array} $	$ \begin{array}{r} 2 \\ 67 \\ \times 43 \\ \hline 201 \\ 0 \end{array} $	$ \begin{array}{r} 2 \\ 2 \\ 67 \\ \times 43 \\ \hline 201 \\ 2,680 \end{array} $	$ \begin{array}{r} 2 \\ 2 \\ 67 \\ \times 43 \\ \hline 201 \\ 2,680 \\ \hline 2,881 \end{array} $