PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

Multiplication Procedure

A Closer Look at the Video

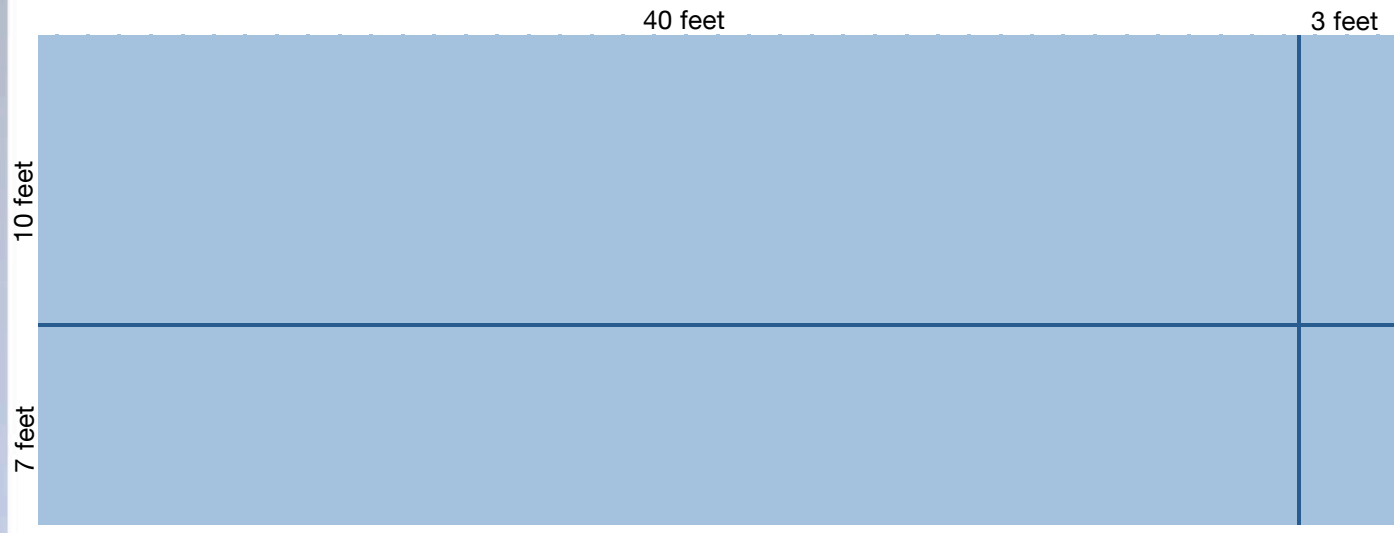
After watching the *Multiplication Procedure* video, make sense of the mathematics by taking a closer look at the problem situation and solution. Use the comments and questions in bold to help you solve the problem and make sense of the paper-and-pencil multiplication procedure.

Problem: An employee at Ray's Floors is working on an estimate for a couple who wants to place tile in a large room. Each tile measures one foot by one foot, or one square foot. The room's dimensions are 17 feet by 43 feet. How many tiles will it take to cover the entire floor?

How can you determine the number of tiles needed to cover the floor? Since each tile measures one foot by one foot, the area of the floor in square feet is equal to the number of tiles.

How can you determine the area of the floor? To find the area, multiply the width times the length (17 feet x 43 feet).

Using a model to solve a multiplication problem helps make sense of the procedure. The following shaded region is an area model that represents a floor that is 17 feet by 43 feet. When you use an area model, you can break the model into parts that are easy to calculate. You can break 17 into 10 and 7 and you can break 43 into 40 and 3. Now, instead of having one challenging problem, you have four simple problems.



The areas of the four regions that make up the floor represent the four simple problems. What multiplication problem does each region represent?

MakingSense

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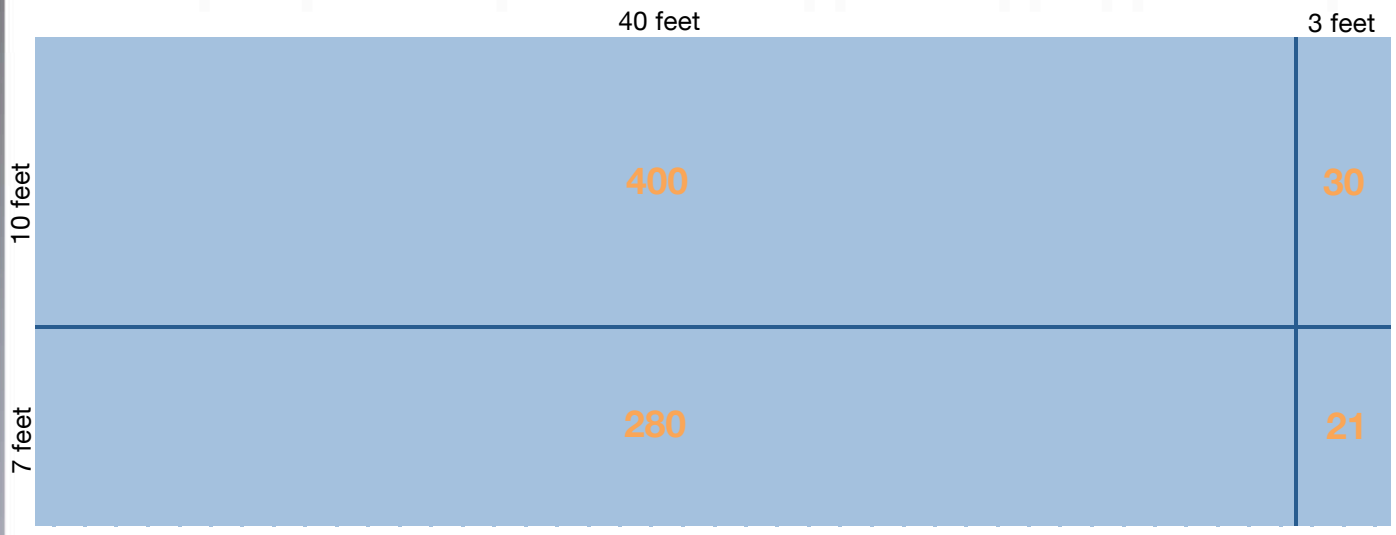

The four simple problems are:

7 x 3 = 21
7 x 40 = 280
10 x 3 = 30
10 x 40 = 400

These numbers represent the number of tiles needed to cover each region. Add the number of tiles for each region to find the total number of tiles needed to cover the floor.

7 x 3 = 21
7 x 40 = 280 } 21 + 280 = 301
10 x 3 = 30
10 x 40 = 400 } 30 + 400 = 430
} 301 + 430 = 731

The couple needs 731 tiles to cover their floor.

Use this model to make sense of the paper and pencil multiplication procedure. Solve the problem again, but this time connect the model to the procedure.

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Multiply 7 times 3 which equals 21. Record the one in the ones place of the answer and 2 tens above the problem in the tens place.

Multiply 7 x 40 which equals 280 and add the extra 20 (the 2 tens). This equals 300. Then add the 1 that is already recorded in the ones place and we have 301.

Cross off the 2 tens that were already used.

Now multiply by 10. 10 x 3 is 30, so record the 30.

Multiply 10 x 40 which is 400 and add the 30 which gives you 430.

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Finally, add 301 and 430 for a total of 731. It will take 731 tiles to cover the floor.

In this video, we used multiplication to find the area of a floor and the number of tiles needed to cover that floor. We used an area model to represent the floor and make sense of the pencil and paper multiplication procedure. The purpose of representing and solving problems with a model is to develop understanding. Once you can make sense of the problem by using a model, using an efficient procedure is appropriate.