Constructing Task: Missing Numbers

In this task, students are challenged to find all the possibilities for missing numbers in a decimal multiplication number sentence.

STANDARDS FOR MATHEMATICAL CONTENT

Perform operations with multi-digit whole numbers and with decimals to the hundredths.

MCC5.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.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

If students use their prior knowledge about whole number multiplication, they will realize that the products will have the exact same digits, but the decimal placement will change the value of the numbers. If students are methodical about their solution strategy, they will be able to find all of the possibilities systematically from 0.1 x 5 = 0.5 to 1.9 x 5 = 9.5.

COMMON MISCONCEPTIONS

- *Multiplication can increase or decrease a number*. From previous work with computing whole numbers, students understand that the product of multiplication is greater than the factors. However, multiplication can have a reducing effect when multiplying a positive number by a decimal less than one or multiplying two decimal numbers together. We need to put the term *multiplying* into a context with which we can identify and which will then make the situation meaningful. Also using the terms *times* and *groups of* interchangeably can assist with the contextual understanding.

ESSENTIAL QUESTIONS

- How can we efficiently solve multiplication and division problems with decimals?
- How can we multiply and divide decimals fluently?
- What strategies are effective for finding a missing factor or divisor?

MATERIALS

- Calculators (optional)

GROUPING

Small group/Individual task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Comments: This task will allow the teacher to see if students are able to use what they know about whole number multiplication and transfer it to decimal multiplication. Students will be able to come up with more solutions if they realize that whole numbers can be represented with decimals. There is no recording sheet provided with this task. Instead, encourage students to document their thinking in their math journals or notebooks.

TASK:

_____._____ *x 5* = _____._____

What might the missing numbers be? Try to find all the possibilities.

FORMATIVE ASSESSMENT QUESTIONS

- How did you get your answer?
- How do you know your answer is correct?
- What patterns are you noticing?

DIFFERENTIATION

Extension

- Students can explore problems like this with two factors that are decimal numbers.

Intervention

- Provide students with some whole number examples before incorporating decimals. Include some examples that only have one solution before moving to multiple solutions. Also, calculators can be used for this task.