

Behind the Numbers: How the String was Crafted

The first two problems illustrate what happens when students double one factor: the value of the product doubles. The third problem halves a factor from the second problem and the value of that product halves. The product now has the same value as the product in the first problem: $2 \times 8 = 4 \times 4$. The string is designed to highlight this strategy for discussion and exploration. The next four problems, therefore, all have the same answer. When the students notice that the answers are the same, explore with them why this is happening. The eighth and ninth problems give students a chance to try the doubling and halving strategy again. The last problem has no helper problems in the string, so students will need to make their own—such as turning 14×5 into 7×10 . See B15 for additional support.

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Doubling and Halving

See B14 for details (page 29).

$$2 \times 12$$

$$4 \times 12$$

$$4 \times 6$$

$$6 \times 8$$

$$12 \times 4$$

$$24 \times 2$$

$$48 \times 1$$

$$4 \times 9$$

$$2 \times 18$$

$$16 \times 5$$

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Associative Property, Doubling and Halving

This minilesson uses a string of related problems to support the development of the doubling and halving strategy and its generalization to other forms such as tripling and thirthing, quadrupling and quartering, etc. The big idea underlying the validity of this strategy is the associative property. For example, 6×10 can be thought of as $(2 \times 3) \times 10$ or as $2 \times (3 \times 10)$. It is