## Lesson 3: Adding and Subtracting Decimals with Few Non-Zero Digits

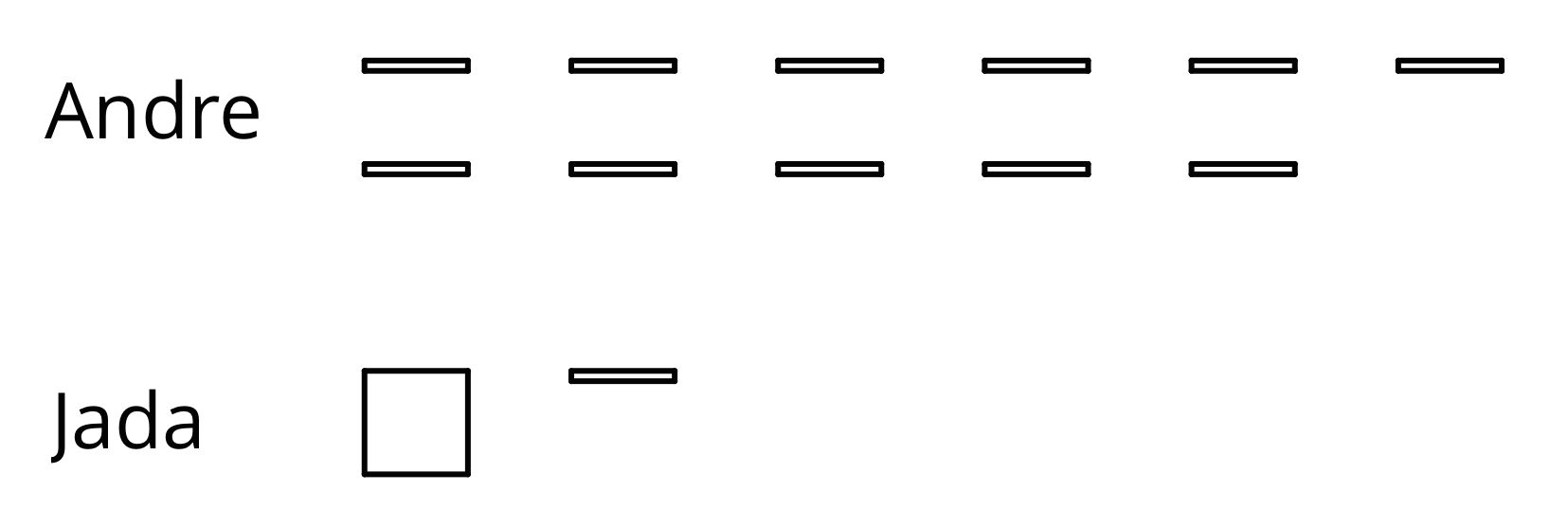
Let’s add and subtract decimals.

### 3.1: Do the Zeros Matter?

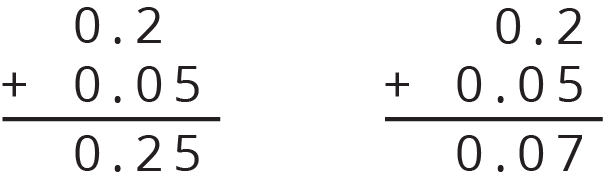
1. Evaluate mentally:
2. Decide if each equation is true or false. Be prepared to explain your reasoning.

### 3.2: Calculating Sums

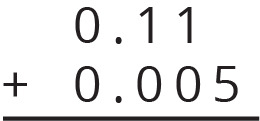
1. Andre and Jada drew base-ten diagrams to represent . Andre drew 11 small rectangles. Jada drew only two figures: a square and a small rectangle.

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  1. If both students represented the sum correctly, what value does each small rectangle represent? What value does each square represent?
  2. Draw or describe a diagram that could represent the sum .

1. Here are two calculations of . Which is correct? Explain why one is correct and the other is incorrect.

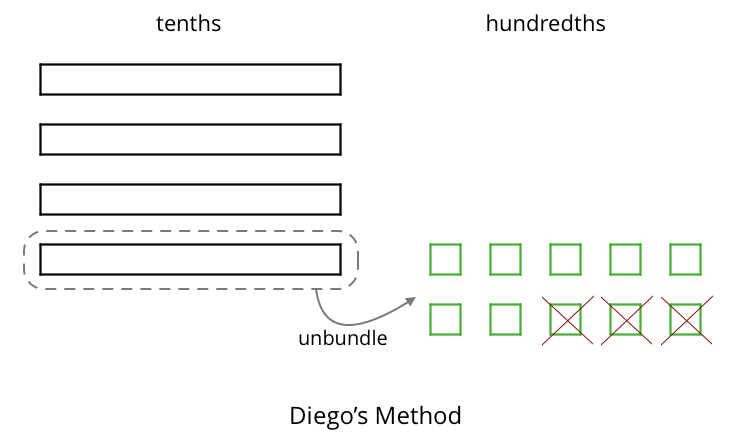
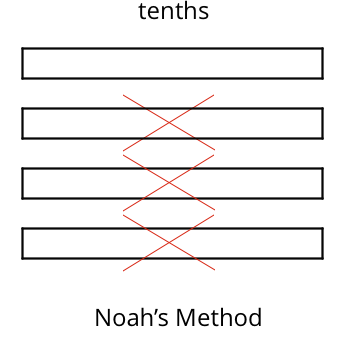
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1. Compute each sum. If you get stuck, consider drawing base-ten diagrams to help you.

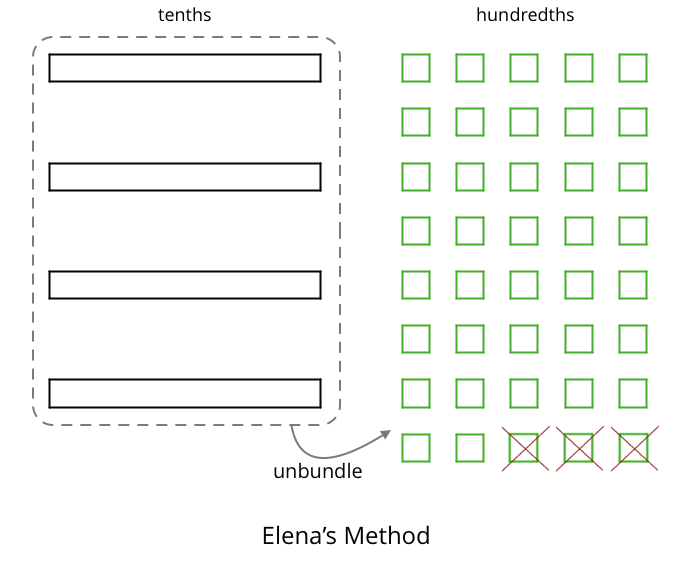
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### 3.3: Subtracting Decimals of Different Lengths

Diego and Noah drew different diagrams to represent . Each rectangle represents 0.1. Each square represents 0.01.

* Diego started by drawing 4 rectangles to represent 0.4. He then replaced 1 rectangle with 10 squares and crossed out 3 squares to represent subtraction of 0.03, leaving 3 rectangles and 7 squares in his diagram.
* 
* Noah started by drawing 4 rectangles to represent 0.4. He then crossed out 3 rectangles to represent the subtraction, leaving 1 rectangle in his diagram.
* 

1. Do you agree that either diagram correctly represents ? Discuss your reasoning with a partner.
2. Elena also drew a diagram to represent . She started by drawing 4 rectangles. She then replaced all 4 rectangles with 40 squares and crossed out 3 squares to represent subtraction of 0.03, leaving 37 squares in her diagram. Is her diagram correct? Discuss your reasoning with a partner.

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1. Find each difference. Explain or show your reasoning.

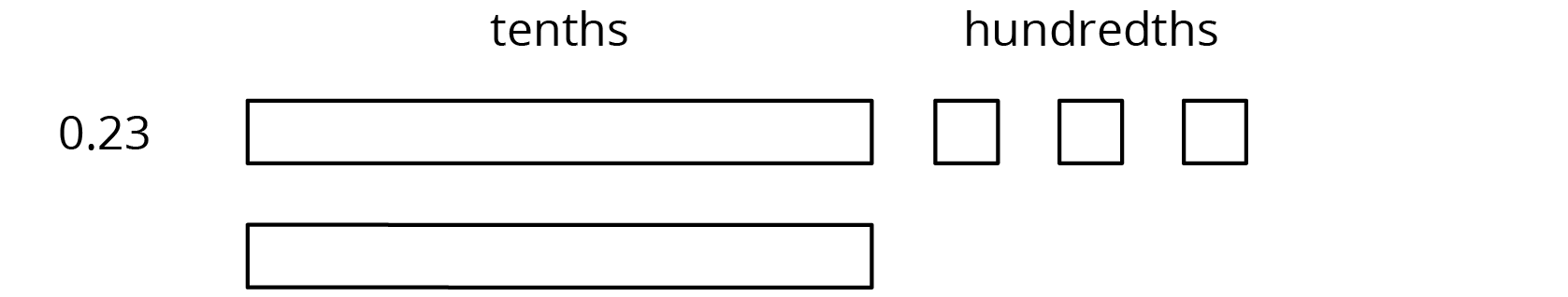
#### Are you ready for more?

A distant, magical land uses jewels for their bartering system. The jewels are valued and ranked in order of their rarity. Each jewel is worth 3 times the jewel immediately below it in the ranking. The ranking is red, orange, yellow, green, blue, indigo, and violet. So a red jewel is worth 3 orange jewels, a green jewel is worth 3 blue jewels, and so on.

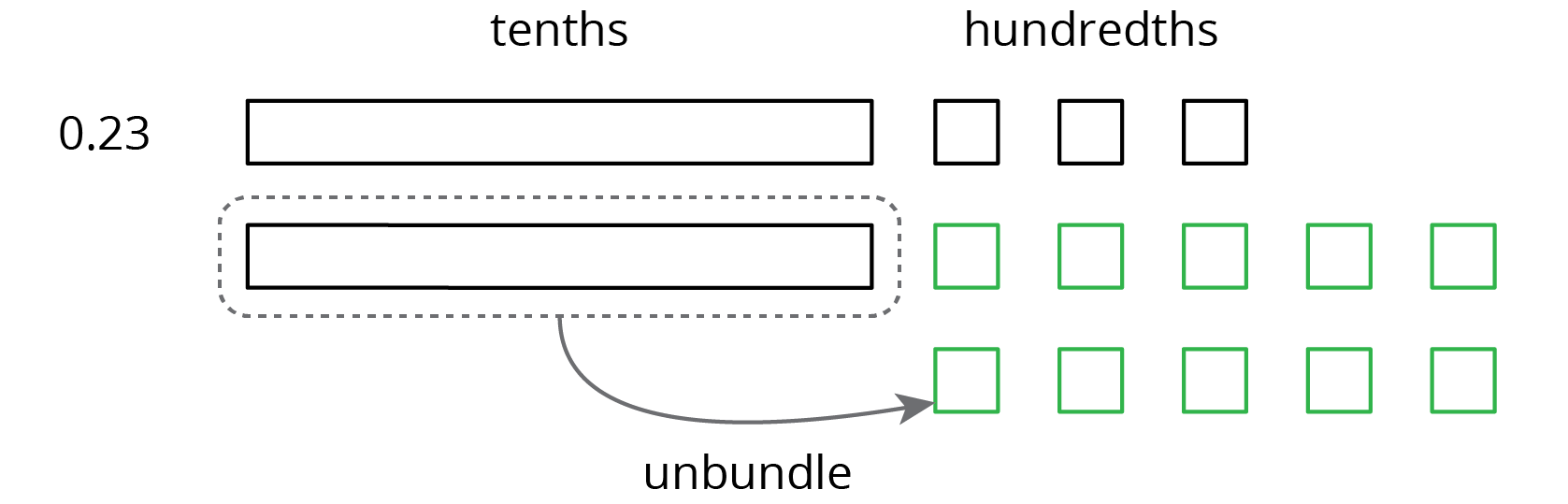
At the Auld Shoppe, a shopper buys items that are worth 2 yellow jewels, 2 green jewels, 2 blue jewels, and 1 indigo jewel. If they came into the store with 1 red jewel, 1 yellow jewel, 2 green jewels, 1 blue jewel, and 2 violet jewels, what jewels do they leave with? Assume the shopkeeper gives them their change using as few jewels as possible.

### Lesson 3 Summary

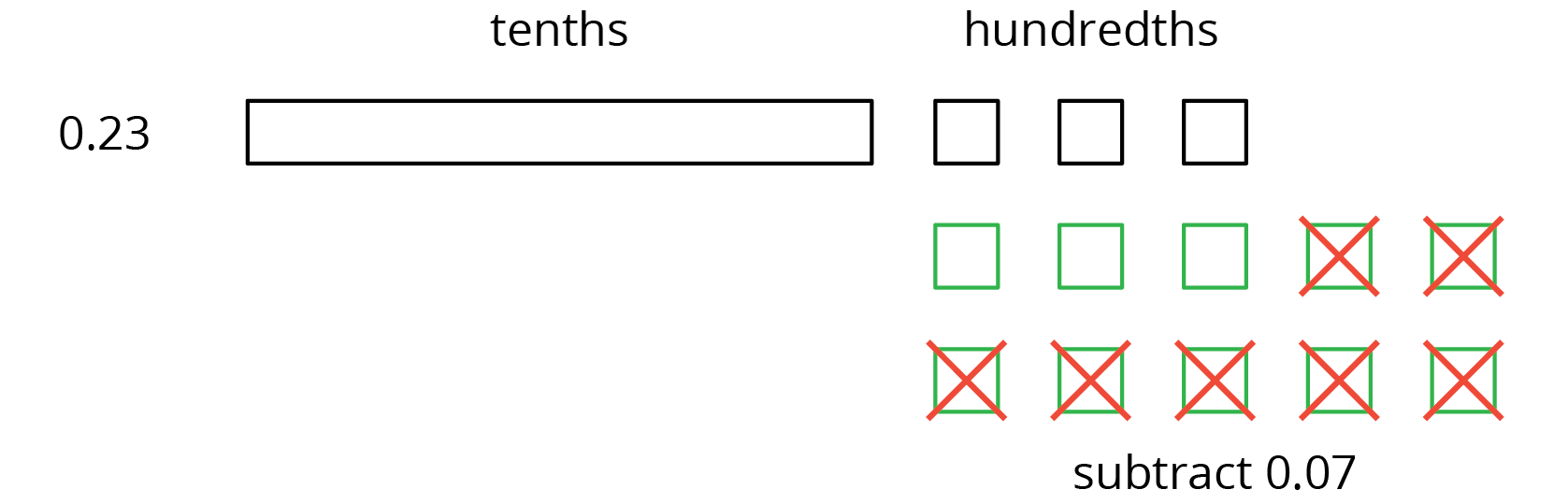
Base-ten diagrams can help us understand subtraction as well. Suppose we are finding . Here is a diagram showing 0.23, or 2 tenths and 3 hundredths.



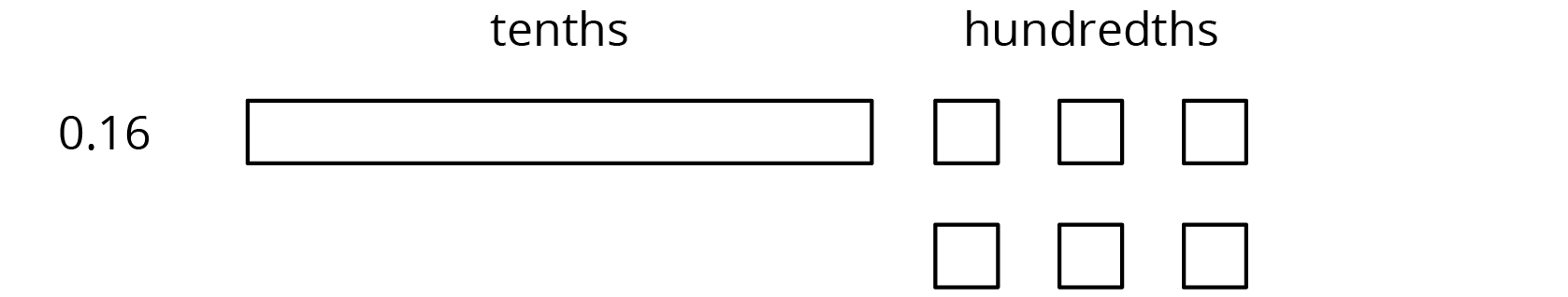
Subtracting 7 hundredths means removing 7 small squares, but we do not have enough to remove. Because 1 tenth is equal to 10 hundredths, we can “unbundle” (or decompose) one of the tenths (1 rectangle) into 10 hundredths (10 small squares).



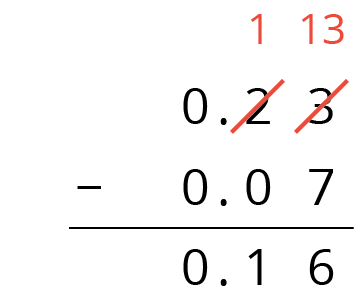
We now have 1 tenth and 13 hundredths, from which we can remove 7 hundredths.



We have 1 tenth and 6 hundredths remaining, so .

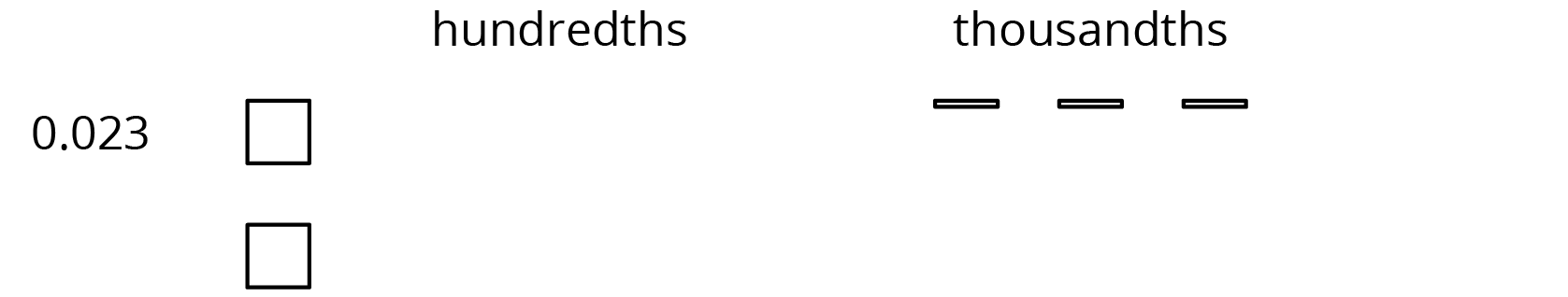


Here is a vertical calculation of .

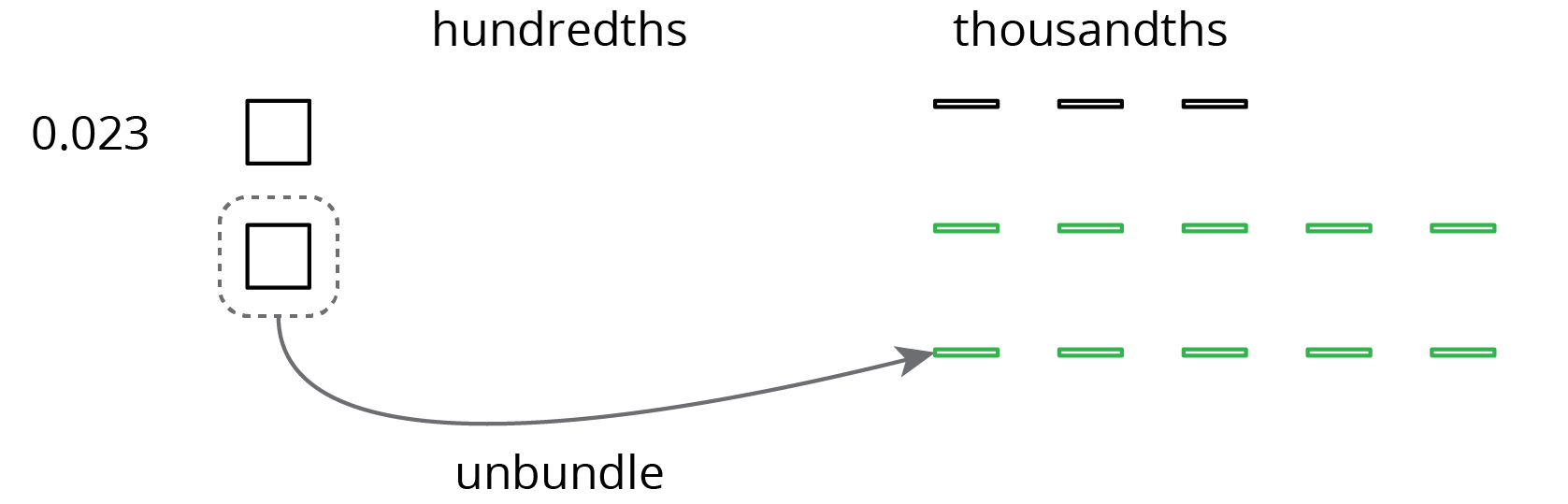


Notice how this representation also shows a tenth is unbundled (or decomposed) into 10 hundredths in order to subtract 7 hundredths.

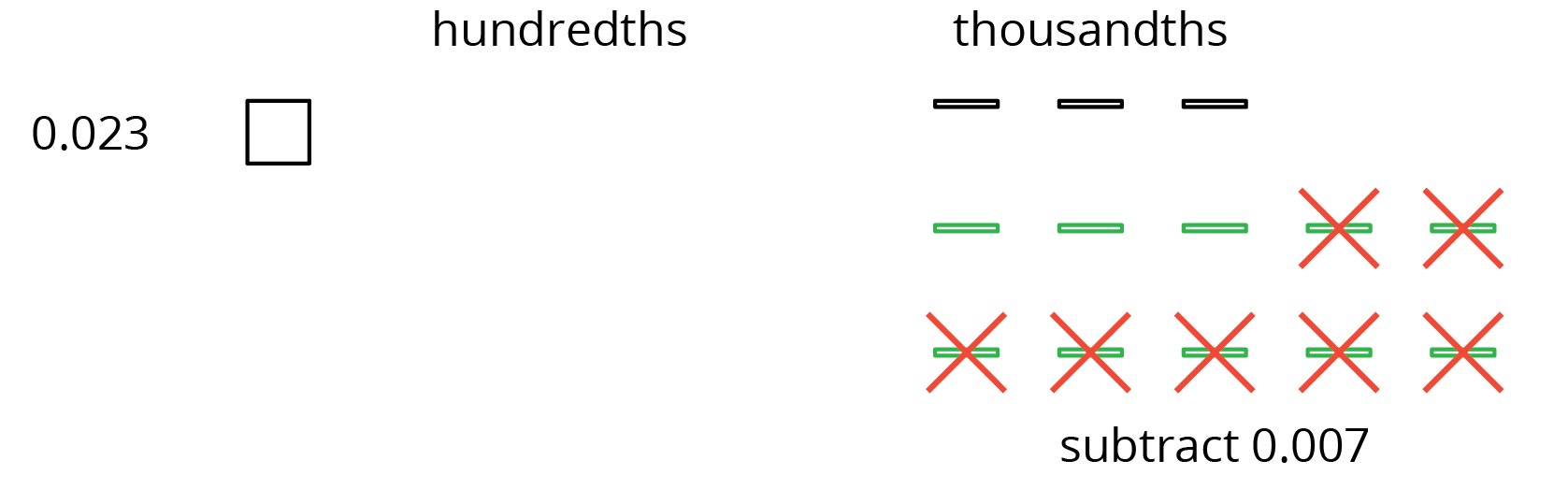
This works for any decimal place. Suppose we are finding . Here is a diagram showing 0.023.



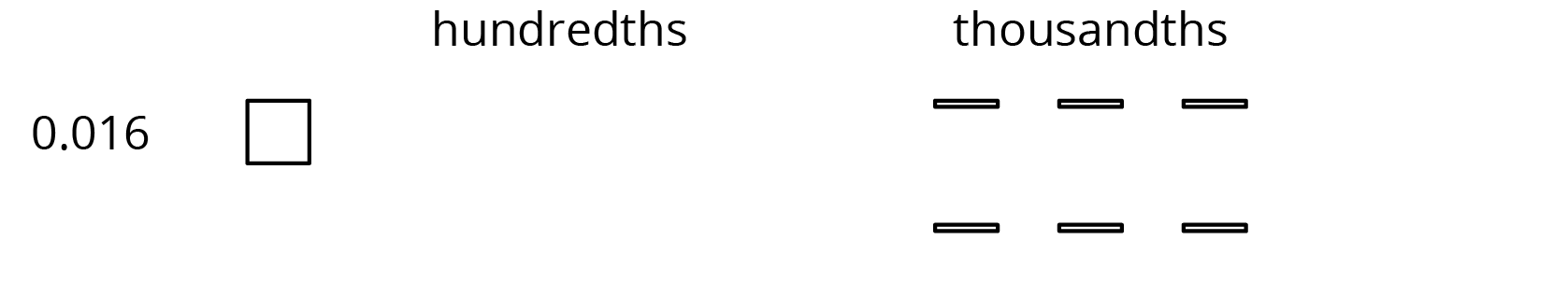
We want to remove 7 thousandths (7 small rectangles). We can “unbundle” (or decompose) one of the hundredths into 10 thousandths.



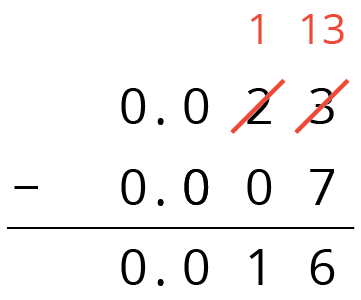
Now we can remove 7 thousandths.



We have 1 hundredth and 6 thousandths remaining, so .



Here is a vertical calculation of .





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