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Unit 5, Lesson 3

# Adding and Subtracting Decimals with Few Non-Zero Digits

Let’s add and subtract decimals.

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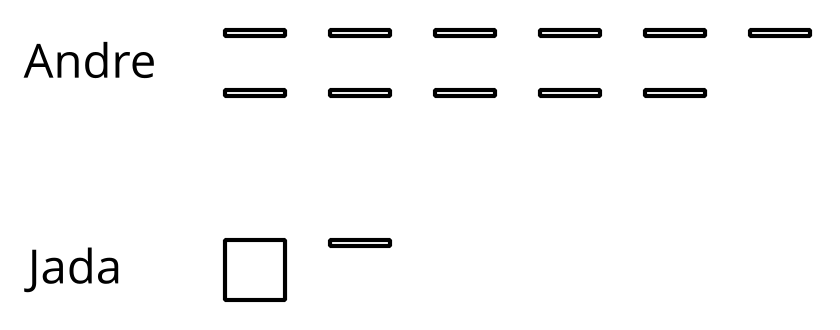
## 3.1Do the Zeros Matter?

1. Find the value mentally:
2. Decide if each statement is true or false. Be prepared to explain your reasoning.

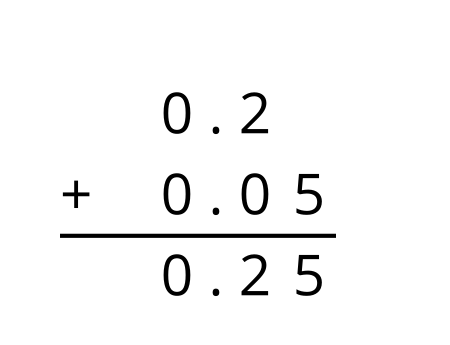
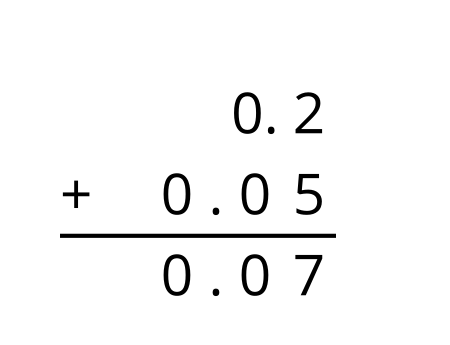
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## 3.2Calculating Sums

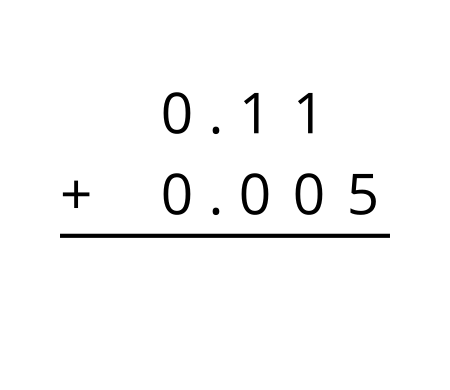
1. Andre and Jada drew base-ten diagrams to represent .

* Andre drew 11 small rectangles.  
  Jada drew only two figures: a square and a small rectangle.
* 
  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.

* 
* 

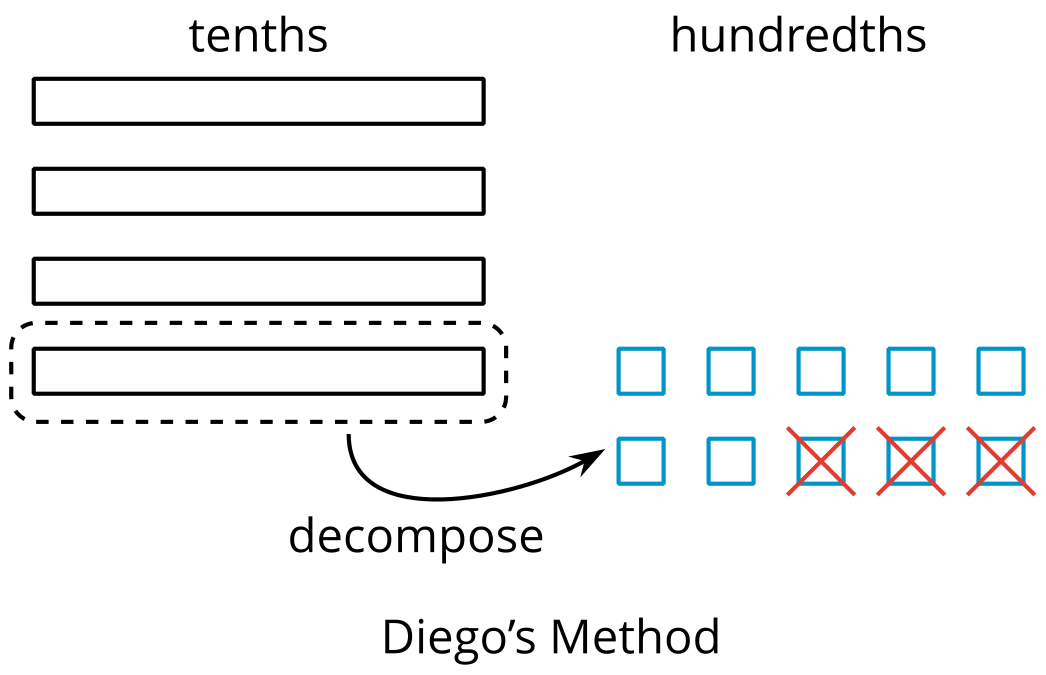
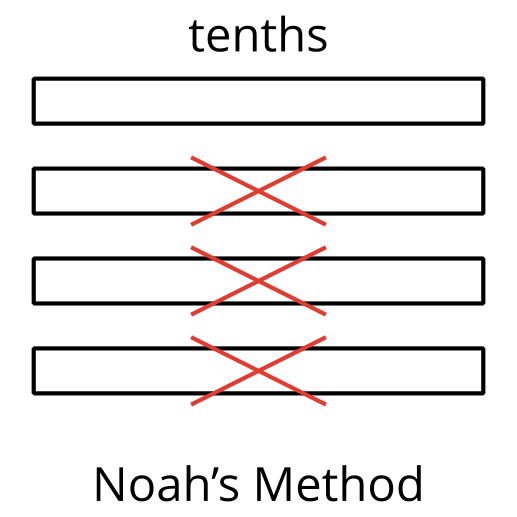
1. Compute each sum. If you get stuck, consider drawing base-ten diagrams to help you.

   * 

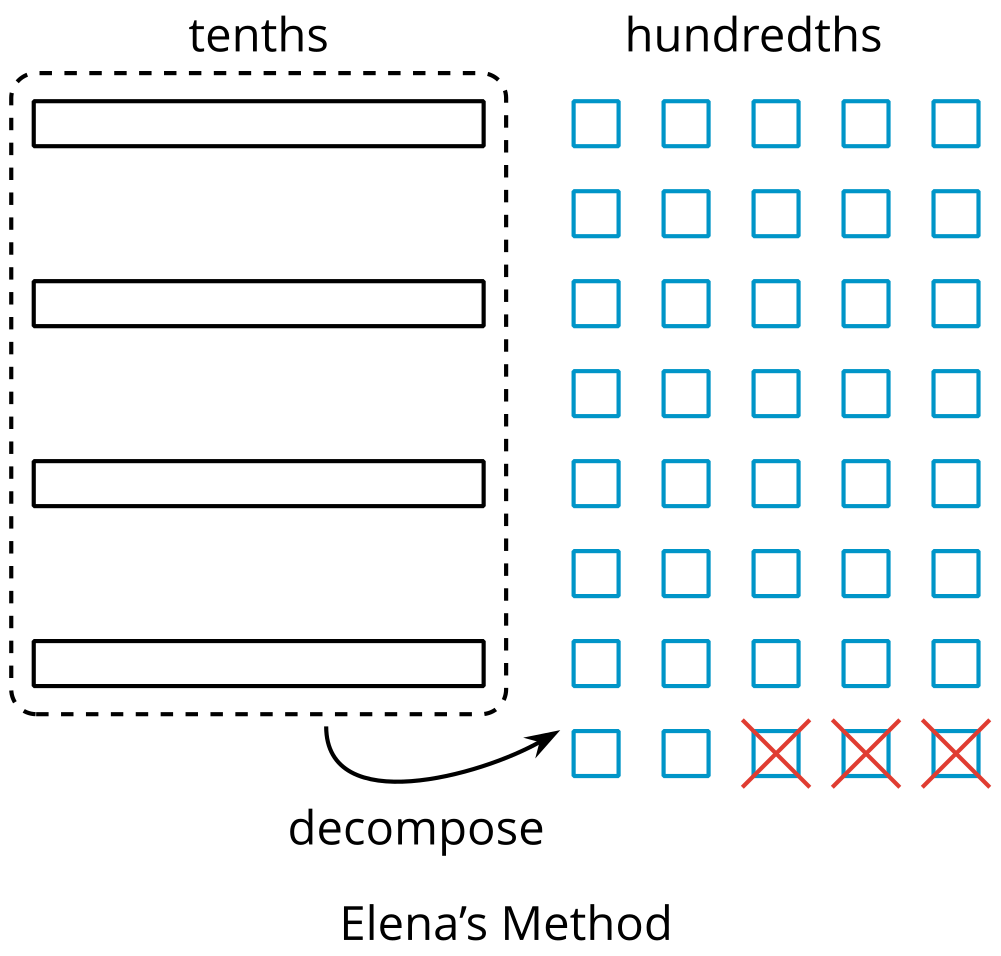
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## 3.3Subtracting Decimals of Different Lengths

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.

* 

1. Find each difference. Be prepared to explain your reasoning. If you get stuck, you can use base-ten blocks or diagrams to represent each expression and find its value.

### Are you ready for more?

In a game, special stones are used for bartering. The values of the stones are based on their color and are ranked as shown, with red having the highest value.

|  |
| --- |
| red |
| orange |
| yellow |
| green |
| blue |
| indigo |
| violet |

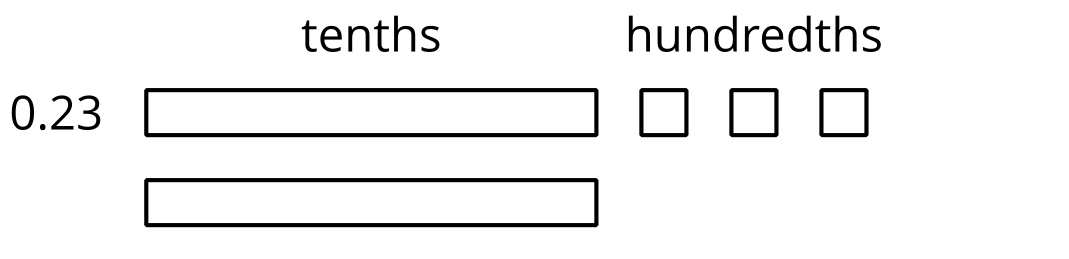
Each color is valued at 3 times the color below it in the ranking. So the value of a red stone is 3 times that of an orange stone, and the value of a green stone is 3 times that of a blue stone.

The stones can be used to buy items. Suppose you want to buy a tool that is worth 2 yellow stones, 2 green stones, 2 blue stones, and 1 indigo stone. You go into the store with 1 red stone, 1 yellow stone, 2 green stones, 1 blue stone, and 2 violet stones.

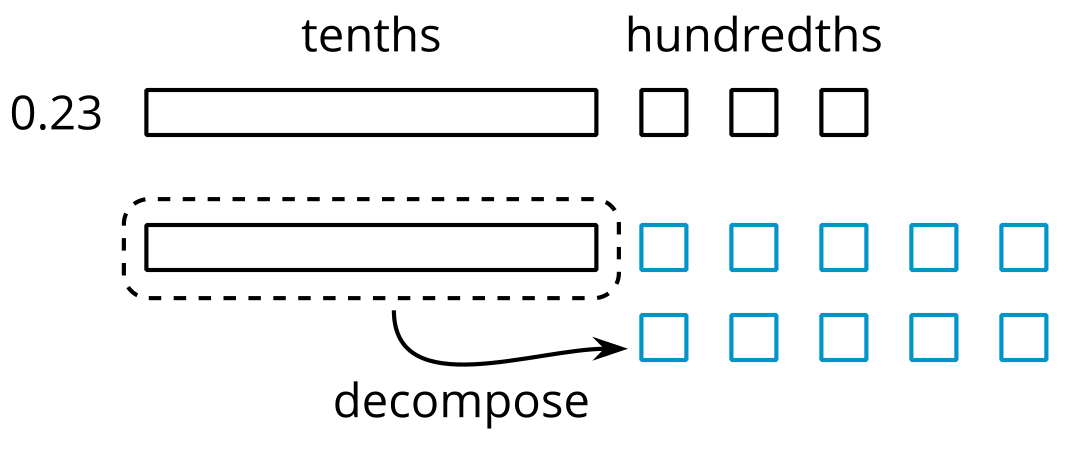
What stones would the shopkeeper give you for the change? Assume the shopkeeper would use as few stones as possible.

## Lesson 3 Summary

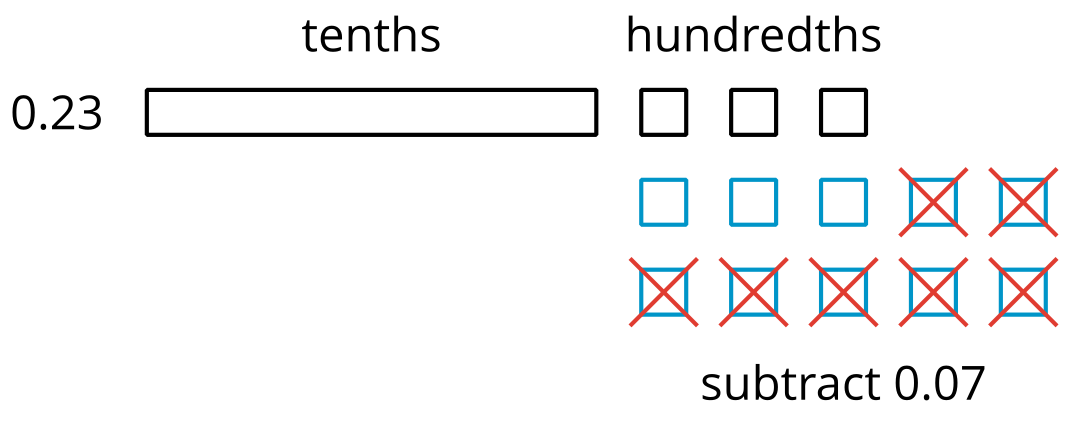
Base-ten diagrams can help us understand subtraction. Suppose we are finding . Here is a diagram showing 0.23, or 2 tenths and 3 hundredths.



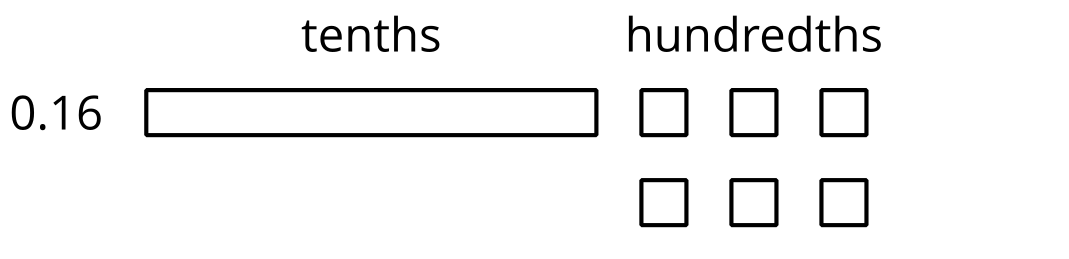
Subtracting 7 hundredths means removing 7 small squares, but we do ;not have enough to remove. Because 1 tenth is equal to 10 hundredths, we can decompose one of the tenths (1 rectangle) into 10 hundredths (10 small squares).



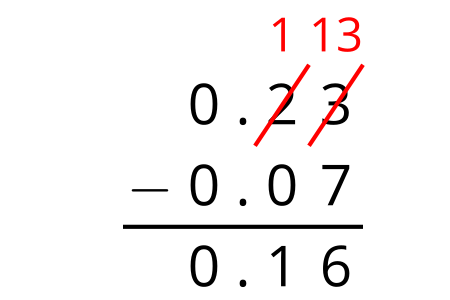
We now have 1 tenth and 13 hundredths, from which we can remove 7 hundredths.



We have 1 tenth and 6 hundredths remaining, so .

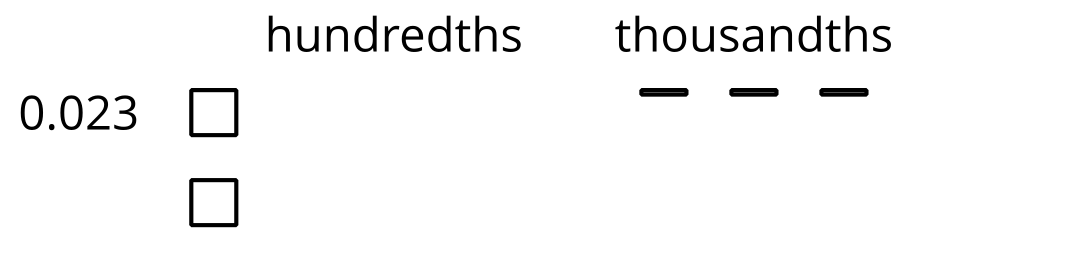


Here is a vertical calculation of .

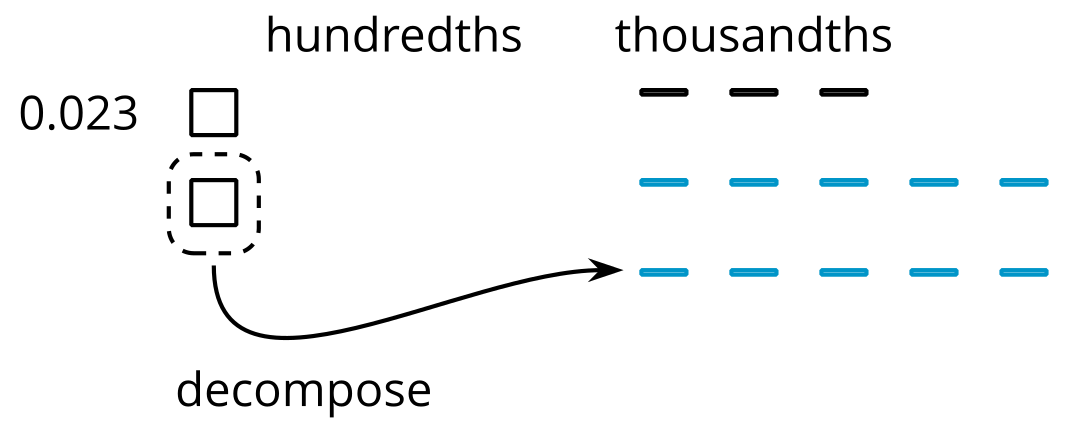


Notice how this representation also shows that a tenth is decomposed into 10 hundredths in order to subtract 7 hundredths.

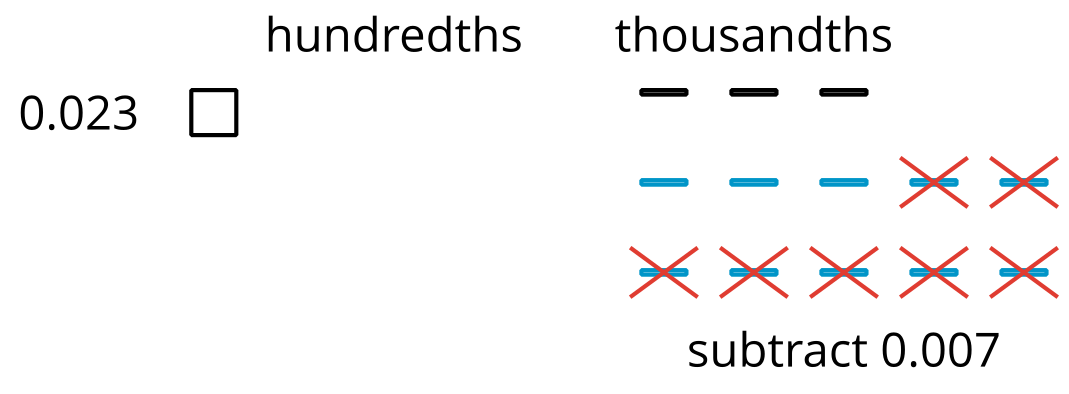
This works for any decimal place. Suppose we are finding . Here is a diagram showing 0.023.



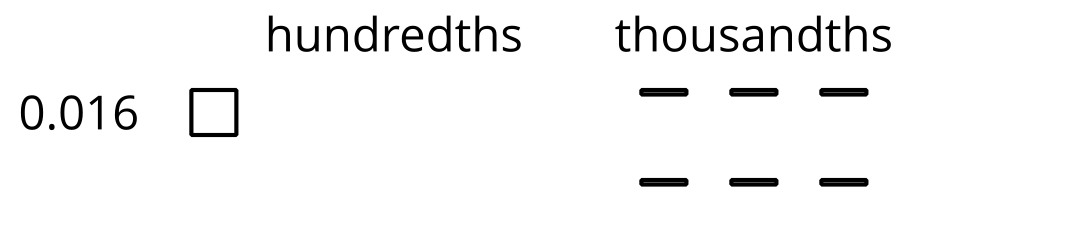
We want to remove 7 thousandths (7 small rectangles). We can decompose one of the hundredths into 10 thousandths.



Now we can remove 7 thousandths.



We have 1 hundredth and 6 thousandths remaining, so .



Here is a vertical calculation of .

