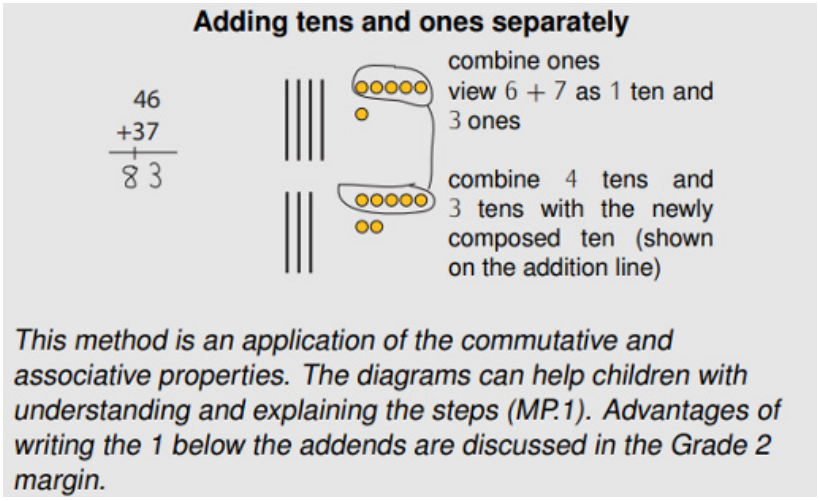
1:10 Two-Digit Addition

Teacher Notes

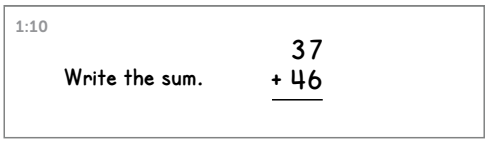
Central math concepts

Having learned that the two digits of a two-digit number represent amounts of tens and ones (see Teacher Notes for task **1:2 Tens and Ones**), students are in a position to calculate sums of two two-digit numbers with total 100 or less, by adding tens and tens, ones and ones, and composing a ten as needed.



Adding ones and ones in the problem 37 + 46 will confront students with the subproblem 7 + 6 = ?, which is itself a nontrivial problem at this grade (CCSS 1.OA.C.6). Students can add ones and ones using so-called Level 2 or Level 3 methods (see the *Progression* document,[†] pp. 14–17 and the Teacher Notes for task **1:11 Using Properties and Relationships**), and/or in some cases by knowing the value of the sum from memory. When the sum of the ones digits is 10 or more, students compose a ten, as shown in the figure. The figure is from the NBT *Progression* document[‡] (pp. 6, 7), which notes that "[c]oncrete objects, cards, or drawings afford connections with written numerical work and discussions and explanations in terms of tens and ones. In particular, showing composition of a ten with objects or drawings affords connection of the visual ten with the written numeral 1 that indicates 1 ten." (Note that the objects, cards, or drawings are not methods, but serve to explain and allow discussion of the numerical work.)

There are other ways to add two two-digit numbers using concepts of place value and properties of addition, such as by counting on by tens (46 + 37 = "56, 66, 76…77-78-79-80-81- 82- 83") or by using an opportunistic strategy such as 46 + 37 = 46 + 4 + 33 = 50 + 33 = 83. But using the concept of place value units to add tens and tens, ones and ones is thinking that generalizes directly and efficiently to more complex problems that students will encounter in grade 2 (see Teacher Notes for task **2:10 Three Digit Addition/Subtraction**).



Answer

83.

Click here for a student-facing version of the task.

Refer to the Standards

1.NBT.C.4; MP.6, MP.7. Standards codes refer to www.corestandards.org. One purpose of the codes is that they may allow a task to shed light on the Standards cited for that task. Conversely, reading the cited Standards may suggest opportunities to extend a task or draw out its implications. Finally, Standards codes may also assist with locating relevant sections in curriculum materials, including materials aligned to comparable standards.

Aspect(s) of rigor

Concepts, Procedural skill and fluency

Additional notes on the design of the task

In the sum 37 + 46, both addends have some tens and some ones, and it is necessary to compose a ten.

Curriculum connection

1. In which unit of your curriculum would you expect to find tasks like 1:10? Locate 2-3 similar tasks in that unit. How are the tasks similar to each other, and to 1:10? In what specific ways do they differ from 1:10?
2. Thinking about the curriculum unit you identified, at what point in the unit might a task like 1:10 help students converge toward grade-level thinking about the important mathematics in the task? What factors would you consider in choosing when to use such a task in the unit?*

Relevant prior knowledge

The following mathematics knowledge may be activated, extended, and deepened while students work on the task: concepts of tens and ones; and adding two two-digit numbers.

Extending the task

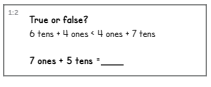
How might students drive the conversation further?

- Students could discuss whether they prefer to add the tens first or add the ones first. (See the relevant *Progression* document, p. 7.)
- Students could consider a three-addend problem with total less than 100, and with no composing a ten required, such as the one shown.

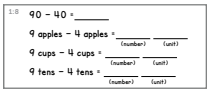
$$\begin{array}{r} 32 \\ 13 \\ +24 \\ \hline \end{array}$$

Related Math Milestones tasks

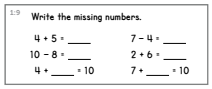
1:2



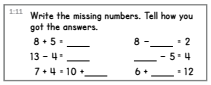
1:8



1:9

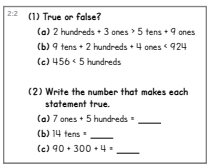


1:11

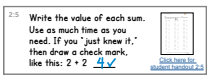


Place value ideas within 100 are the subject of task **1:2 Tens and Ones**. Task **1:8 Subtracting Units** portrays a two-digit subtraction problem as a matter of subtracting two single-digit numbers of tens units. Sums of single-digit numbers are involved in tasks **1:9 Fluency within Ten** and **1:11 Using Properties and Relationships**.

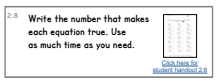
2:2



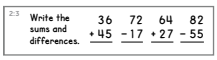
2:5



2:8

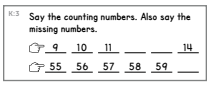


2:3

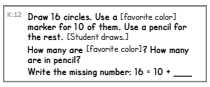


Place value concepts are the subject of task **2:2 Place Value to Hundreds**. Tasks **2:5 Sums of Single-Digit Numbers** and **2:8 Fluency within the Addition Table** involve the single-digit sums and related differences upon which multi-digit addition and subtraction algorithms are built. Two-digit sums and differences are addressed from a fluency perspective in task **2:3 Fluency within 100 (Add/Subtract)**.

K:3



K:12



In earlier grades, task **K:3 Say the Numbers (Teens, Decades)** involves the count sequence for two-digit numbers, and task **K:12 Make Ten and Some More** involves the structure of a teen number as ten ones and some more ones.

† Common Core Standards Writing Team. (2011, May 29). *Progressions for the Common Core State Standards in Mathematics (draft): K, Counting and Cardinality; K–5, Operations and Algebraic Thinking*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona. Page numbers in this Teaching Note refer to this *Progression* document.

‡ Common Core Standards Writing Team. (2015, March 6). *Progressions for the Common Core State Standards in Mathematics (draft). Grades K–5, Number and Operations in Base Ten*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

* Math Milestones™ tasks are not designed for summative assessment. Used formatively, the tasks can reveal and promote student thinking.

1:10 Two-Digit Addition

Teacher Notes

Math Milestones™

Anticipating and responding to student thinking about the task

Imagine how students might think about the task, and what you might see and hear while they work.

On this page, you can write your thoughts on the following questions.

Solution Paths

- What solution paths might you expect to see?
- What representations might you see? What correspondences between those representations might be noticed by students (or be worth pointing out to students) and discussed by them?
- What misconceptions or partial understandings might be revealed as students work on the task? How could you respond to these positively and productively?

Language

- What might you expect to hear from students engaged with the task? What does that language reveal about their mathematical thinking, and how might you respond to different ways of thinking?
- If students are using early English or using multiple languages in an integrated communication system, how might you help their classmates see those mathematical ideas as valuable?
- Even when using nascent language, students are thinking and communicating their thinking. What might it look like to respond positively and productively to the mathematics in their thinking before giving feedback on the language used?

Identity, Agency, and Belonging

- How can you engage students' interests, experiences, or funds of knowledge?
- How can you build students' self-confidence as learners, thinkers, and doers of mathematics?
- What choices are there for a student to make in the task? How can you build students' agency to the point where they notice and make these choices to solve problems?
- How might one use feedback to build student agency? Where might there be opportunities to build students' self-confidence?