5.7 Addition: Two-digit numbers (empty number line)

In this lesson, students add two-digit numbers and show their thinking on an empty number line. The numbers used require students to bridge multiples of 10 or 100.

Step 1 Preparing the lesson

You will need:

- 1 cube labeled: 10, 20, 30, 40, 50, 60 (*Note:* Retained from Extra Practice 5.6.)

Each group of students will need:

- 2 cubes labeled:
  cube A: 55, 62, 65, 74, 75, 81
  cube B: 30, 35, 42, 45, 51, 55 (*Note:* Retained from Extra Practice 5.6; retain for Extra Practice 5.7.)

Each student will need:

- Student Journal 5.7
- paper
- 12-inch ruler

Step 2 Starting the lesson

Review what the students know about empty number lines. Draw an empty number line on the board. Ask, *How could you show the position of 65 on this empty number line?* Encourage discussion among the students, reminding them to communicate clearly and to use correct math terms to describe their thinking (**SMP6**). They should explain that 65 could be positioned at any point along the number line as there are no other numbers marked. Mark the position of 65 to the left of the number line. Then ask, *How could you use this number line to figure out 65 + 9?* Choose a volunteer to model their strategy on the number line. For example, making a jump from 65 to 70, then a jump of 4 more to 74. Repeat the discussion with other examples such as 47 + 8, and 18 + 30.

Step 3 Teaching the lesson

Write the prices $54 and $32 on the board above an empty number line. Then discuss the points below:

How can you use the empty number line to figure out the total cost?

What number would you locate on the number line?

How can you break the other number into parts to make it easier to add?

What jumps will you draw to show your thinking?

What equation can you write to match your thinking?

Invite students to model their strategy and write their equation on the board (**SMP4**). Make sure they explain how the two models represented the numbers in the problem. Talk about the different ways to break the lesser number (32) into parts to make it easier to add. For example, students might split the number by place value and think 54 + 30 + 2 or 54 + 2 + 30, while others may decompose the 30 and think 54 + 10 + 10 + 10 + 2. Ask, *Who finds it easier to model their strategy on an empty number line, rather than a number line that is marked with numbers? Why (why not)?* Encourage discussion among the class (**SMP6**).

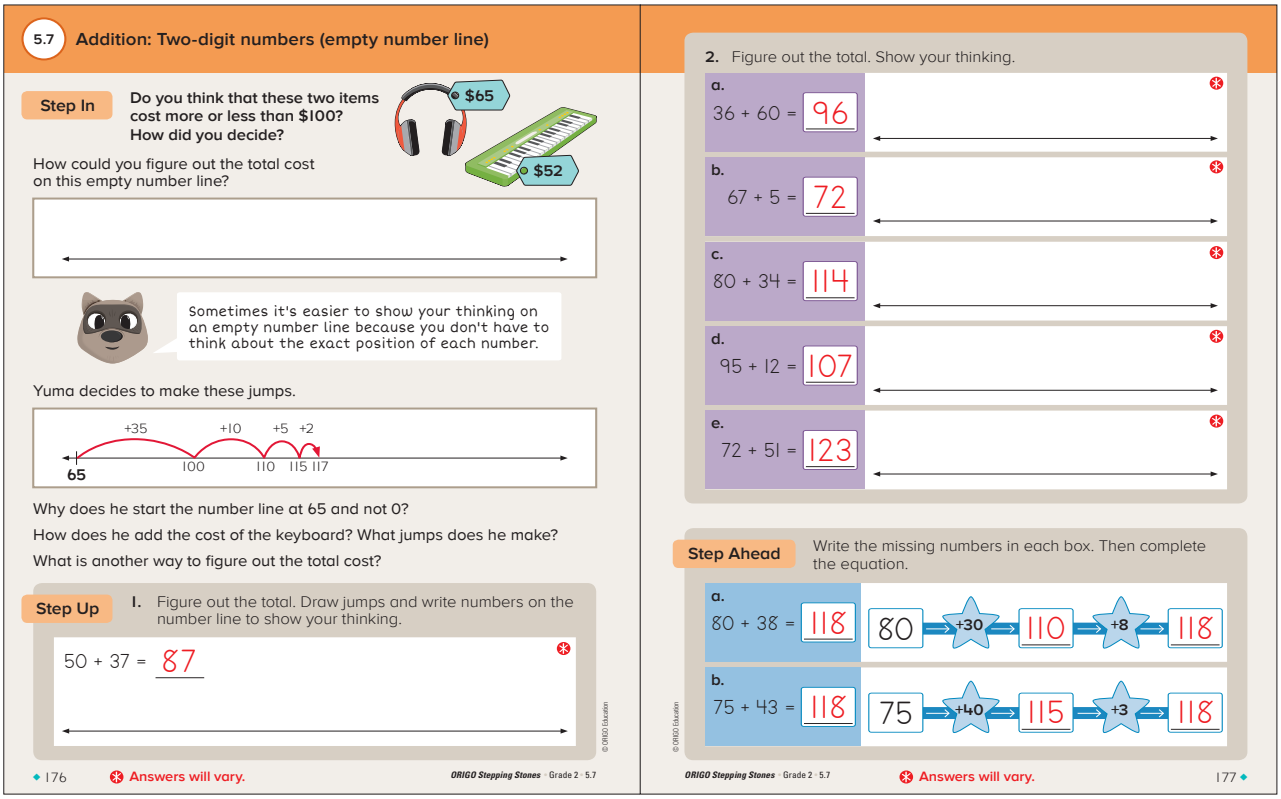
ELL

Allow the students to watch the game for a few rounds to understand the directions. Then invite them to engage in the activity.

2.OA.A.1 Solve addition word problems
2.NBT.B.5 **2.NBT.B.7** Use a strategy to add two-digit numbers (with composing)
2.NBT.B.9 Explain a computation strategy
2.MD.B.6 Use number lines to represent addition

Major clusters
Represent and solve problems involving addition and subtraction.
Use place-value understanding and properties of operations to add and subtract.
Relate addition and subtract to length.

Student Journal 5.7, pp. 176–177



5.7 Addition: Two-digit numbers (empty number line)

Step In
Do you think that these two items cost more or less than $100? How did you decide?

How could you figure out the total cost on this empty number line?

Sometimes it's easier to show your thinking on an empty number line because you don't have to think about the exact position of each number.

Yuma decides to make these jumps.

Why does he start the number line at 65 and not 0?
How does he add the cost of the keyboard? What jumps does he make?
What is another way to figure out the total cost?

Step Up
1. Figure out the total. Draw jumps and write numbers on the number line to show your thinking.

50 + 37 = 87

176 Answers will vary. ORIGO Stepping Stones · Grade 2 · 5.7

2. Figure out the total. Show your thinking.

a. 36 + 60 = 96
b. 67 + 5 = 72
c. 80 + 34 = 114
d. 95 + 12 = 107
e. 72 + 51 = 123

Step Ahead
Write the missing numbers in each box. Then complete the equation.

a. 80 + 38 = 118 — 80 +30 110 +8 118
b. 75 + 43 = 118 — 75 +40 115 +3 118

ORIGO Stepping Stones · Grade 2 · 5.7 Answers will vary. 177

Explain that the size of the jumps and the relative position of each number are not really important when using an empty number line. The purpose of the empty number line is to capture the thinking steps that were followed. Repeat the activity for the prices $25 and $92.

Organize students into groups and distribute the sets of cubes. Ask each student to use their ruler to draw several empty number lines on a sheet of paper. Students then take turns to roll the cubes, say the numbers they roll, and use an empty number line to show how they figure out the total. One point is awarded if the total is greater than 100. The first player to score five points wins. Observe their addition strategies. Ask questions such as, *How did you figure out the total? What jumps did you draw to show your thinking? What numbers are you hoping to roll?*

Work through the Step In discussion (Student Journal 5.7) with the whole class. Read the Step Up and Step Ahead instructions with the students. Make sure they know what to do, then have them work independently to complete the tasks.

Step 4 Reflecting on the work

Discuss the students' answers to Student Journal 5.7. Refer to Question 2 and have the students demonstrate their strategies on a number line on the board (or use the *Flare Number Line* online tool). Encourage students to describe what they like about each other's strategies and what they think they could improve (**SMP3**).

Applications

If time allows, have the students complete this Investigation and/or Problem solving activity.

Investigation: Addition using a hundred chart

Each pair of students will need:

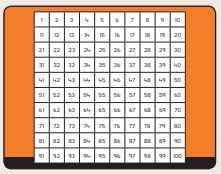
- 1 hundred chart from *The Number Case*

Write the investigation question and equation, as shown, on the board. Organize the students into pairs and distribute the hundred charts. Ask, *What is one way to complete the equation? How could you check to see if the equation is correct?* Explain to the students that they can use the hundred chart to help. When the students understand what the question is asking, allow time for them to list the possible equations. Bring the class back together and discuss the process they used to figure out the possible answers. Work with the class to list the 66 possible solutions on the board.

Investigation question

How many different pairs of whole numbers will make this addition equation true?

Hundred chart



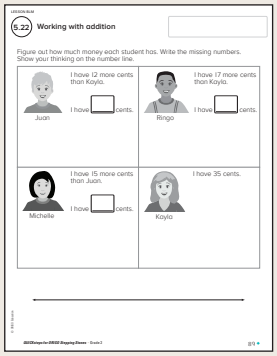
Problem solving: Working with addition

Each student will need:

- 1 copy of Blackline Master 5.22

Distribute the blackline master and read the instructions with the students. Make sure they understand what they need to do and have them work independently to complete the activity. Afterward, invite students to share their answers and explain their thinking. Ask questions such as, *What amount did you figure out first? What numbers did you show on the number line? What jumps did you make for each calculation?*

Blackline Master 5.22



Enrichment

Total cents

Each pair of students will need:

- tub of play money (dimes, nickels, and pennies)

Organize students into pairs and distribute the resources. In turn, each student takes two handfuls of coins and figures out the value in each group. They then record an addition equation to show how they would add to find the total value of all their coins. They then compare totals and the student with the greater total scores one point. The activity is repeated until one student scores a total of five points to win the game.

Small group differentiation

Extra help

Each group of students will need:

- 2 cubes labeled (from Extra Help 5.6):
  cube A: 40, 50, 60, 70, 80, 90
  cube B: 20, 25, 30, 35, 40, 45

Each student will need:

- 12-inch ruler

Organize students into groups and distribute the cubes. Ask each student to use their ruler to draw several empty number lines on a sheet of paper. Students take turns to roll the cubes, say the numbers they rolled, and use an empty number line to show how they figure out the total. One point is awarded if the total is greater than 100. The first player to score five points wins.

Extra practice

Each group of students will need:

- 2 cubes labeled (from Lesson 5.7):
  cube A: 55, 62, 65, 74, 75, 81
  cube B: 30, 35, 42, 45, 51, 55

Each student will need:

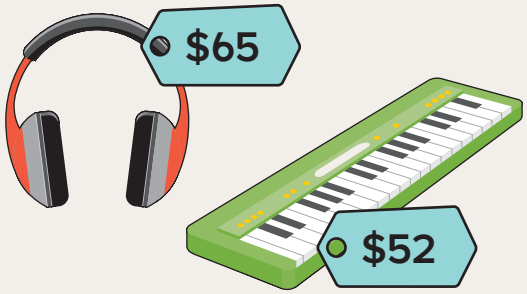
- 12-inch ruler

Organize students into groups and distribute the cubes. Ask each student to use their ruler to draw several empty number lines on a sheet of paper. Students take turns to roll the cubes, say the numbers they rolled, and use an empty number line to show how they figure out the total. One point is awarded if the total is greater than 100. The first player to score five points wins.

5.7 Addition: Two-digit numbers (empty number line)

Step In

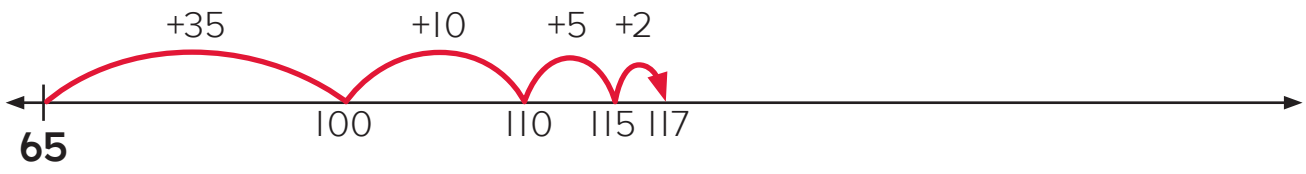
Do you think that these two items cost more or less than $100? How did you decide?



How could you figure out the total cost on this empty number line?

Sometimes it's easier to show your thinking on an empty number line because you don't have to think about the exact position of each number.

Yuma decides to make these jumps.



Why does he start the number line at 65 and not 0?

How does he add the cost of the keyboard? What jumps does he make?

What is another way to figure out the total cost?

Step Up

1. Figure out the total. Draw jumps and write numbers on the number line to show your thinking.

50 + 37 = _____

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2. Figure out the total. Show your thinking.

a. 36 + 60 = ____

b. 67 + 5 = ____

c. 80 + 34 = ____

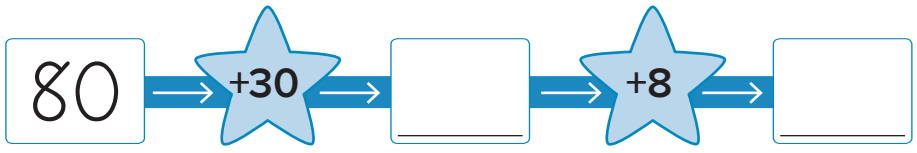
d. 95 + 12 = ____

e. 72 + 51 = ____

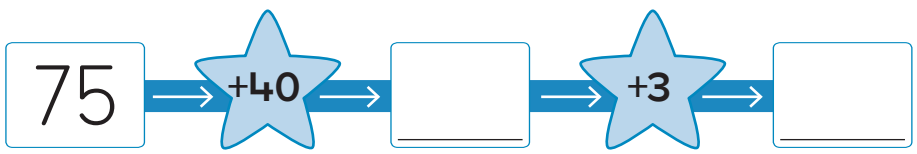
Step Ahead

Write the missing numbers in each box. Then complete the equation.

a. 80 + 38 = ____



b. 75 + 43 = ____



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2. Figure out the total. Show your thinking.

a. 36 + 60 = 96

b. 67 + 5 = 72

c. 80 + 34 = 114

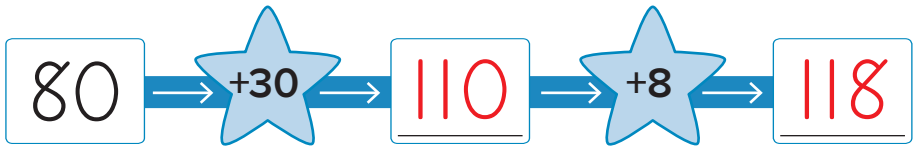
d. 95 + 12 = 107

e. 72 + 51 = 123

Step Ahead

Write the missing numbers in each box. Then complete the equation.

a. 80 + 38 = 118



b. 75 + 43 = 118

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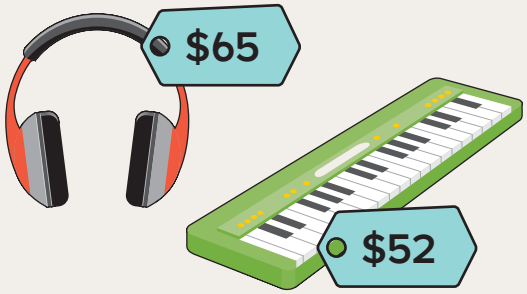
Answers will vary.

5.7 Addition: Two-digit numbers (empty number line)

Step In

Do you think that these two items cost more or less than $100? How did you decide?



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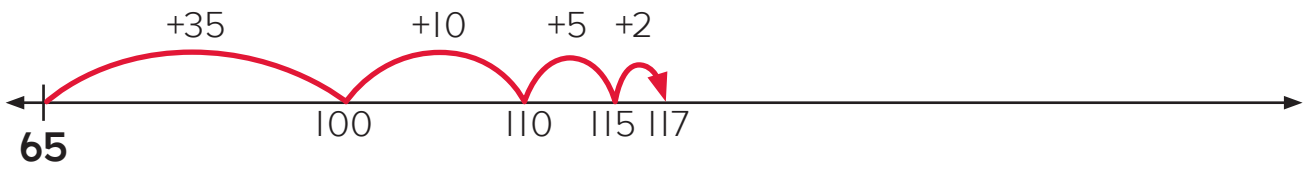
Yuma decides to make these jumps.



Why does he start the number line at 65 and not 0?

How does he add the cost of the keyboard? What jumps does he make?

What is another way to figure out the total cost?

Step Up

1. Figure out the total. Draw jumps and write numbers on the number line to show your thinking.

50 + 37 = 87

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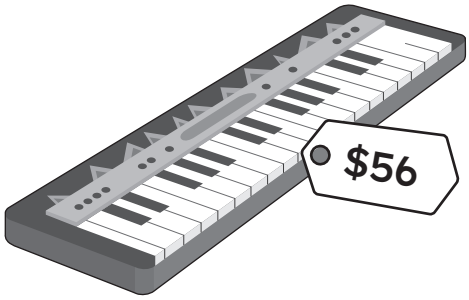
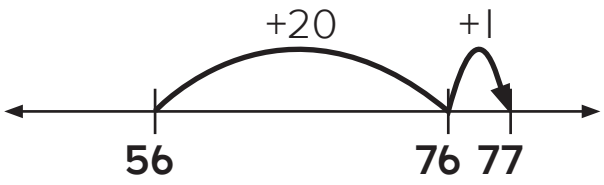
Answers will vary.

1

A student used a strategy to add these prices.





Use the same strategy to add each pair of prices below.
Show your thinking on the number line.

a.

Total = $_____

b.

Total = $_____

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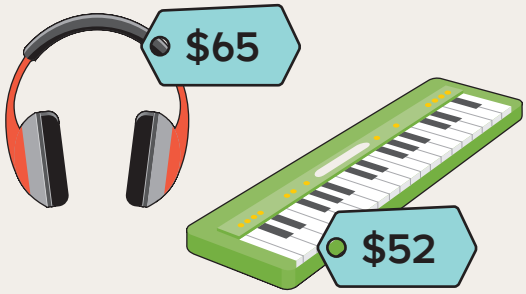
2.NBT.B.5 + 2.NBT.B.7

5.7 Suma: Números de dos dígitos (recta numérica en blanco)

Conoce

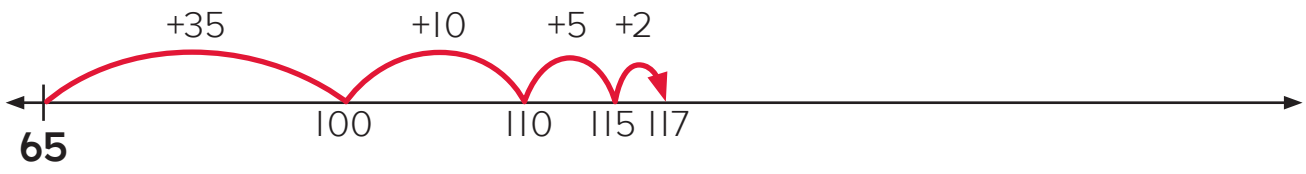
¿Piensas que estos dos artículos cuestan más o menos de $100? ¿Cómo lo decidiste?



¿Cómo podrías calcular el costo total en esta recta numérica en blanco?

A veces es más fácil indicar tu razonamiento en una recta numérica en blanco porque no tienes que pensar en la posición exacta de cada número.

Yuma decide dar estos saltos.



¿Por qué él inicia la recta numérica en 65 y no en 0?

¿Cómo suma el costo del teclado? ¿Qué saltos da?

¿Cuál es otra manera de calcular el costo total?

Intensifica

1. Calcula el total. Dibuja saltos y escribe números en la recta numérica para indicar tu razonamiento.

50 + 37 = _____

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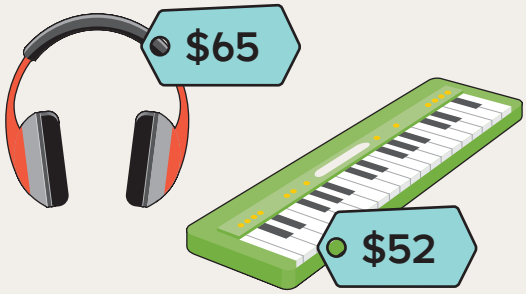
5.7 Suma: Números de dos dígitos (recta numérica en blanco)

Conoce

¿Piensas que estos dos artículos cuestan más o menos de $100? ¿Cómo lo decidiste?



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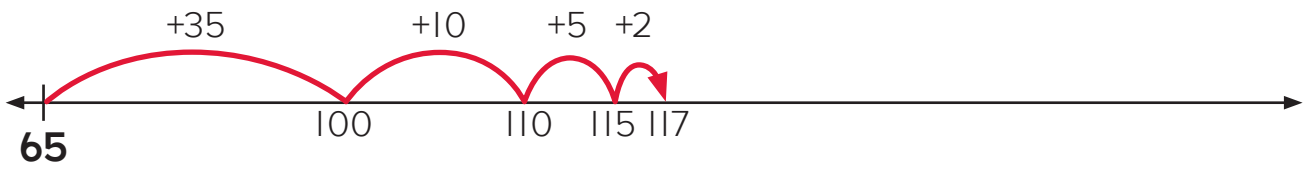

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1. Calcula el total. Dibuja saltos y escribe números en la recta numérica para indicar tu razonamiento.

50 + 37 = 87

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✻ Las respuestas pueden variar.

2. Calcula el total. Indica tu razonamiento.

a. $36 + 60 =$ _____

b. $67 + 5 =$ _____

c. $80 + 34 =$ _____

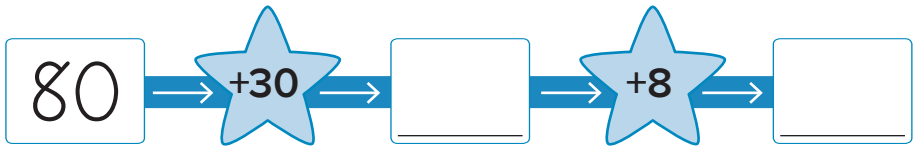
d. $95 + 12 =$ _____

e. $72 + 51 =$ _____

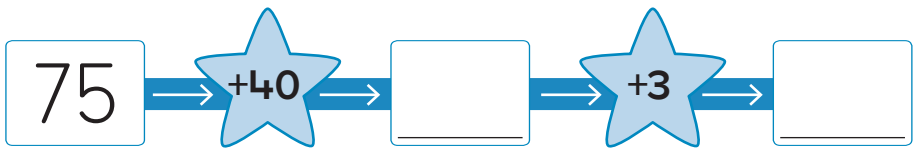
Avanza

Escribe los números que faltan en cada casilla.
Luego completa la ecuación.

a. $80 + 38 =$ _____



b. $75 + 43 =$ _____



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2. Calcula el total. Indica tu razonamiento.

a. 36 + 60 = 96

b. 67 + 5 = 72

c. 80 + 34 = 114

d. 95 + 12 = 107

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Avanza

Escribe los números que faltan en cada casilla.
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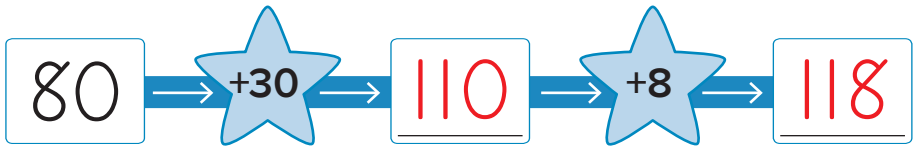
a. 80 + 38 = 118



b. 75 + 43 = 118

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✻ Las respuestas pueden variar.

I

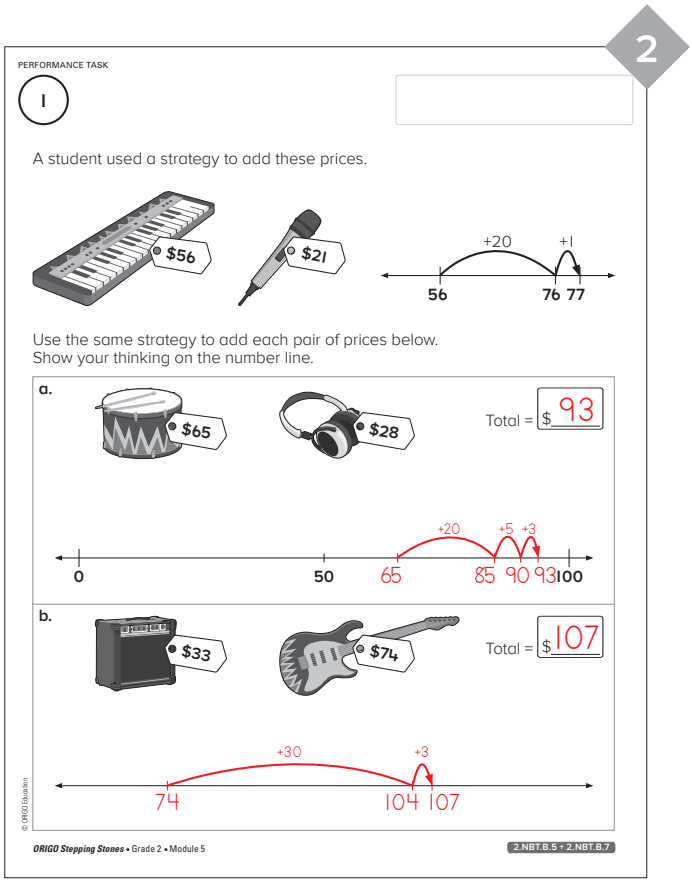
Ensure students understand that they are to use the same strategy shown in the example to figure out each total.

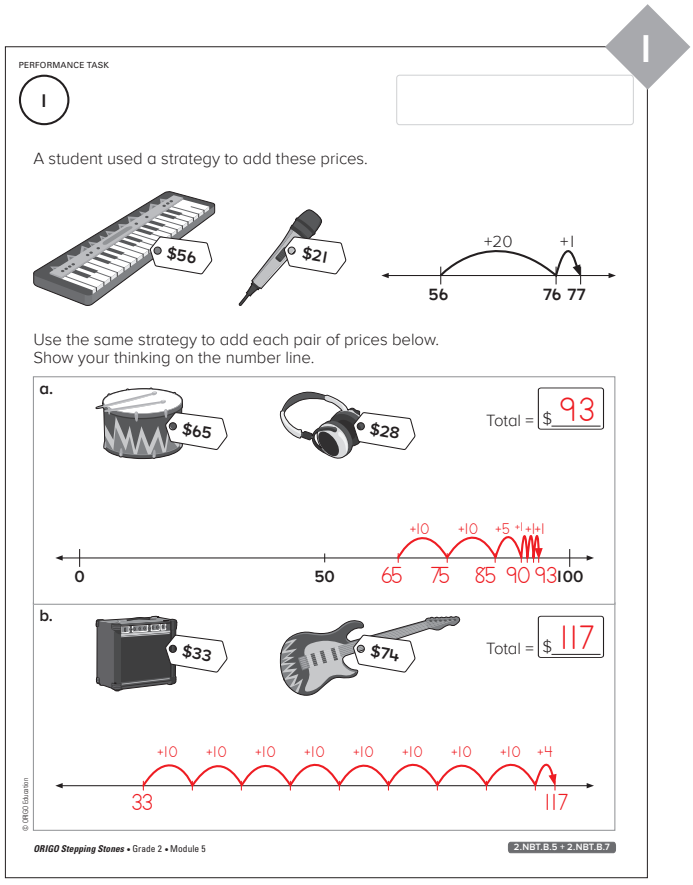
Scoring Rubric and Examples

2 Meets requirements.
Shows complete understanding.
- Wrote one addend on the number line.
- Showed the other addend as a series of efficient jumps.
- Found the correct total for both questions.

I Partially meets requirements.
Shows some understanding.
- Wrote one addend on the number line.
- Showed the other addend as a series of jumps. The jumps may not be efficient.
- Found the correct total for one question.

0 Does not meet requirements.
Shows no understanding.





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