

Student Guide

Break-Apart Products with Larger Numbers

Questions 1–10 (SG pp. 103–105)

- 1.* Estimations and strategies will vary. Possible response: There are about 150 tiles; 29 is close to 30 and $30 \times 5 = 150$.
2. **A.** She broke the 29 foot-long side into sections of 20 ft. and 9 ft.
- B.** The unshaded part has 5 rows and 20 columns. The shaded part has 5 rows and 9 columns.
- C.** 100 squares in the unshaded part. 45 squares in the shaded part.
- D.** $100 + 45 = 145$ squares.
- E.** Responses will vary.
3. **A.** The 5 represents the number of rows in each of the rectangles.
- B.** The 20 and 9 represent the number of columns in each part.
- C.** 5 represents the number of rows in the first rectangle, 20 represents the number of columns. 100 is the number of tiles in the first rectangle.
- D.** 5 represents the number of rows in the second rectangle and 9 represents the number of columns. 45 is the number of tiles in the second rectangle.
- E.** They added the number of tiles in each rectangle.

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Break-Apart Products with Larger Numbers

Use the *Exploring Break-Apart Products with Larger Numbers* pages in the *Student Activity Book* to find the number of squares in larger rectangles.

Discuss

A hall floor in Bessie Coleman School is covered with square tiles that are one foot on each side. The hall is five feet wide and 29 feet long. Ana and Linda are trying to find out how many tiles cover the hall floor.

Ana sketched the floor on grid paper.

1. Estimate the total number tiles on the hall floor. Be ready to explain your estimation strategy.

Ana broke the rectangle into parts like this:

2. **A.** How did Ana break apart the rectangle?
- B.** How many rows and columns are in each part?
- C.** How many squares are in each part?
- D.** What is the total number of squares?
- E.** Is Ana's answer close to your estimate from Question 1?

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Linda wanted to solve the problem but she did not have grid paper. So she sketched rectangles to show her work. Here is her sketch for 5×29 :

3. Use Ana's and Linda's rectangles to answer the questions below:
 - A.** What does the 5 represent?
 - B.** What do the 20 and 9 represent?
 - C.** What does each number in the sentence $5 \times 20 = 100$ represent?
 - D.** What does each number in the number sentence $5 \times 9 = 45$ represent?
 - E.** How did they find the total number of squares in the large rectangle?
4. Solve the following problems by breaking the larger number into tens and ones. Sketch rectangles like Linda did to show your work.

A. 4×18	B. 5×36	C. 34×6
D. 5×42	E. 8×63	F. 54×9
5. Choose a problem in Question 4. Find a way to solve the problem using mental math. Explain your strategy.

Using Expanded Form

6. Shannon and Ming did not use pictures of rectangles to solve 5×29 . They solved the problem by writing 29 in expanded form. Here is how they recorded their work:

Shannon's way: $\begin{array}{r} 29 = 20 + 9 \\ \times 5 \quad \times 5 \\ \hline 100 + 45 = 145 \end{array}$	Ming's way: $\begin{array}{r} 29 = 20 + 9 \\ \times 5 \quad \times 5 \\ \hline 100 \\ + 45 \\ \hline 145 \end{array}$
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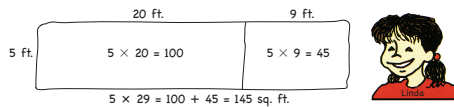
 - A.** Discuss with a partner what the numbers in Shannon's and Ming's calculations mean.
 - B.** Tell how the numbers in Shannon's problem match Ana's rectangle.

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*Answers and/or discussion are included in the lesson.

Linda wanted to solve the problem but she did not have grid paper. So she sketched rectangles to show her work. Here is her sketch for 5×29 :



3. Use Ana's and Linda's rectangles to answer the questions below:
- What does the 5 represent?
 - What do the 20 and 9 represent?
 - What does each number in the sentence $5 \times 20 = 100$ represent?
 - What does each number in the number sentence $5 \times 9 = 45$ represent?
 - How did they find the total number of squares in the large rectangle?
4. Solve the following problems by breaking the larger number into tens and ones. Sketch rectangles like Linda did to show your work.
- 4×18
 - 5×36
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5. Choose a problem in Question 4. Find a way to solve the problem using mental math. Explain your strategy.

Using Expanded Form

6. Shannon and Ming did not use pictures of rectangles to solve 5×29 . They solved the problem by writing 29 in expanded form. Here is how they recorded their work:

Shannon's way:

$$\begin{array}{r} 29 = 20 + 9 \\ \times 5 \quad \times 5 \\ \hline 100 + 45 = 145 \end{array}$$

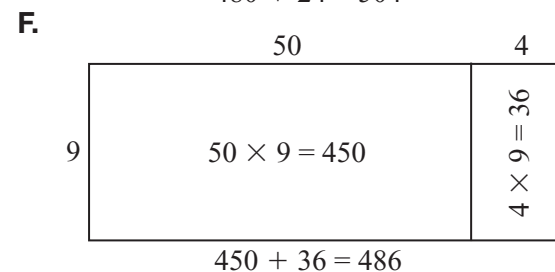
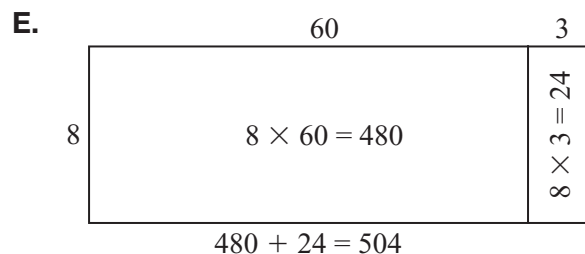
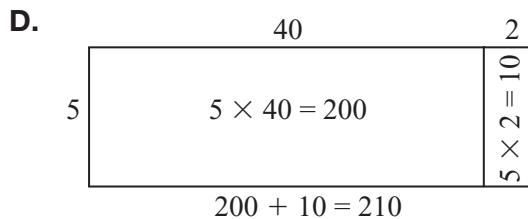
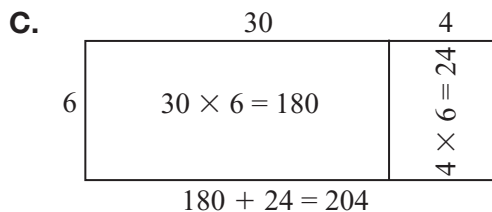
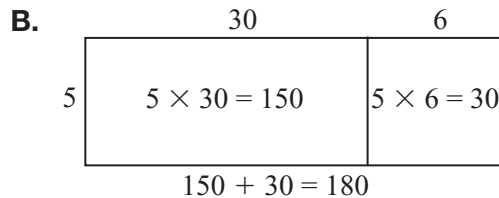
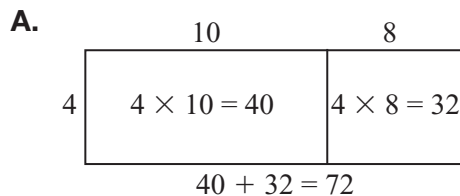
Ming's way:

$$\begin{array}{r} 29 = 20 + 9 \\ \times 5 \quad \times 5 \\ \hline 100 \\ + 45 \\ \hline 145 \end{array}$$

- Discuss with a partner what the numbers in Shannon's and Ming's calculations mean.
- Tell how the numbers in Shannon's problem match Ana's rectangle.

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4. Responses will vary.



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- Possible response for Question 4A:
 $4 \times 20 = 80$, $4 \times 2 = 8$, $80 + 8 = 88$.
- A.*** The 29 is broken into 20 and 9. Both students multiplied 5×20 to get 100 and 5×9 to get 45. Then they added $100 + 45 = 145$.
B.* Splitting the 29 into 20 and 9 is the same as when Ana broke the 29 ft. length of the rectangle into 20 ft. and 9 ft. pieces. The 5 is the same as the 5 rows of Ana's rectangle.
100 is the number of squares in the large part of Ana's rectangle. 45 is the number in the small part. 145 is the number in the whole rectangle.

*Answers and/or discussion are included in the lesson.

7. Shannon's way

$$\begin{array}{r} 73 = 70 + 3 \\ \times 4 \quad \times 4 \\ \hline 280 + 12 = 292 \end{array}$$

Ming's way

$$\begin{array}{r} 73 = 70 + 3 \\ \times 4 \quad \times 4 \\ \hline 280 \\ + 12 \\ \hline 292 \end{array}$$

8. Methods will vary.

- A.** 122
- B.** 188
- C.** 273
- D.** 410
- E.** 176
- F.** 360

9. Methods will vary.

- A.** 126
- B.** 238

10. Possible response for Question 9A:

3 is half of 6; $3 \times 21 = 63$;
 $63 + 63 = 126$.

Homework

Questions 1–2 (SG. p. 105)

- | | | |
|------------------|---------------|---------------|
| 1. A. 120 | B. 120 | C. 240 |
| D. 240 | E. 360 | F. 360 |
| G. 400 | H. 400 | |
| 2. A. 42 | B. 147 | C. 112 |
| D. 365 | E. 324 | F. 434 |
| G. 232 | H. 297 | I. 188 |

3. Possible response for Question 2G:

$8 \times 30 = 240$
 $240 - 8 = 232$

7. Solve 73×4 using expanded form. Choose either Shannon's way or Ming's way to record your work.

8. Solve the following problems by breaking the larger number into tens and ones. Record your work using a sketch like Linda or expanded form like Shannon or Ming.

A. 61×2 **B.** 47×4 **C.** 3×91
D. 82×5 **E.** 4×44 **F.** 72×5

✓ Check-In: Questions 9-10

9. Solve the following problems using rectangles like Linda or expanded form like Shannon or Ming.

A. 6×21 **B.** 34×7

10. Choose a problem from Question 9 and find a way to break a factor into two parts to solve the problem using mental math. Show or tell your thinking.

Homework

1. Solve the following problems.

A. 60×2 **B.** 20×6 **C.** 3×80
D. 8×30 **E.** 40×9 **F.** 90×4
G. 8×50 **H.** 5×80

2. Solve the following problems by breaking the larger number into tens and ones. Record your work using a sketch of a rectangle like Linda did or expanded form like Shannon or Ming.

A. 14×3 **B.** 3×49 **C.** 28×4
D. 73×5 **E.** 6×54 **F.** 62×7
G. 8×29 **H.** 33×9 **I.** 94×2

3. Choose a problem from Question 2 to solve using mental math. Show or tell your mental math strategy.

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