Partial-Quotients Division

**Page 63
Answer Key**

1. 27

2. 92

3. 73

4. 3,365

5. 56

6. 68

7. 19

8. 149

**Page 64
Answer Key**

1. 21

2. 18

3. 24

4. 41

5. 25

6. 15

7. 23

8. 60

**Page 65
Answer Key**

1. 19

2. 18

3. 13

4. 27

5. 16 R9

6. 12 R4

7. 11 R4

8. 68

*In partial-quotients division, it takes several steps to find the quotient. At each step, you find a partial answer (called a **partial quotient**); then you find the product of the partial quotient and divisor and subtract it from the dividend. Finally, you add all the partial quotients to find the final quotient.*

Even those students whose basic-facts knowledge and estimation skills are limited can find correct answers using this commonsense approach. In the process, students quickly discover that the better their estimates, the fewer the steps.

Build Understanding

Using page 63, explain that with this method of dividing, students will be making mental estimates. Students may find it helpful to make a list of multiplication facts for the divisor. Use questions like the following to guide students through the example:

- When you make the first estimate, what question must you ask yourself? *(How many 6s are in 354?)*

- Why is a multiple of 10 a good number to start with? *(because multiples of 10 are easy numbers to work with)*

- Where do you record your guesses (or partial quotients)? *(in a separate column to the right of the problem)*

- How do you find the final quotient (the answer) and where is it recorded? *(You find the sum of the partial quotients and record it below the column to the right of the problem.)*

Error Alert Watch for students who make the first estimate as if they were using the standard long-division algorithm—that is, looking at only the first two digits of the dividend. Remind students that when they're using this algorithm, they have to think about the whole number, not part of the number. So the first estimate will be an answer to the question, "How many equal groups of the divisor are in the *whole* dividend?"

Check Understanding

Have a volunteer go to the board and solve a division problem. Encourage the student to explain her or his strategy while working so that the class can follow along. Have students direct their questions to the volunteer, and guide that student in answering as necessary. If many students are confused about a particular aspect of the algorithm, do another problem on the board. When you are reasonably certain that most of your students understand the algorithm, assign the "Check Your Understanding" exercises at the bottom of page 63. For more difficult problems, refer students to pages 64 and 65. *(See answers in margin.)*

Division

Partial-Quotients Division (1-digit divisor) **FOCUS ALGORITHM**

To find the number of 6s in 354, first find all the partial quotients. Record them in a column to the right of the problem. Then add the partial quotients to find the final quotient or answer.

Example

(dividend) (divisor)
$$354 \div 6$$

Ask: How many [6s] are in 354? (at least 50)

The first partial quotient is 50.

$50 * 6 = 300$

Subtract 300 from 354.

```
6)354
  300  50
   54
   54   9
    0  59
```

Ask: How many [6s] are in 54? (9)

The second partial quotient is 9.

$9 * 6 = 54$

Subtract 54 from 54.

The difference is 0, so there is no remainder.

Add the partial quotients. The answer is 59.

$$354 \div 6 = 59$$

Check Your Understanding

Solve the following problems.

1. $135 \div 5$ **2.** $736 \div 8$ **3.** $292 \div 4$

4. $6,730 \div 2$ **5.** $392 \div 7$ **6.** $204 \div 3$

7. $9\overline{)171}$ **8.** $6\overline{)894}$

Write your answers on a separate sheet of paper.   **Student Practice**   **63**

Division

FOCUS ALGORITHM

Partial-Quotients Division (2-digit divisor)

To find the number of 27s in 621, first find all the partial quotients. Record them in a column to the right of the problem. Then add the partial quotients to find the final quotient or answer.

(dividend)   (divisor)

$$621 \div 27$$

Example

Ask: How many [27s] are in 621? (at least 20)

The first partial quotient is 20.

$20 * 27 = 540$

Subtract 540 from 621.

```
27)621
   540  |20
    81  |
    81  | 3
     0   23
```

Ask: How many [27s] are in 81? (3)

The second partial quotient is 3.

$3 * 27 = 81$

Subtract 81 from 81.

The difference is 0, so there is no remainder.

Add the partial quotients. The answer is 23.

$$621 \div 27 = 23$$

Check Your Understanding

Solve the following problems.

1. $273 \div 13$ **2.** $342 \div 19$ **3.** $768 \div 32$

4. $902 \div 22$ **5.** $425 \div 17$ **6.** $630 \div 42$

7. $36)\overline{828}$ **8.** $57)\overline{3,420}$

Division

Partial-Quotients Division (2-digit divisor)   FOCUS ALGORITHM

To find the number of 12s in 238, first find all the partial quotients. Record them in a column to the right of the problem. Then add the partial quotients to find the final quotient or answer.

Example

(dividend)   (divisor)
$$238 \div 12$$

Ask: How many [12s] are in 238? (at least 10)
The first partial quotient is 10.
$10 * 12 = 120$
Subtract 120 from 238.

Ask: How many [12s] are in 118? (9)
The second partial quotient is 9.
$9 * 12 = 108$
Subtract 108 from 118.
The difference is the remainder.

```
12)238
   120   |10
   118
   108   | 9
    10    19
```
↑ Remainder   ↑ Quotient

Add the partial quotients to find the quotient.
The answer is 19 R10.

$$238 \div 12 \rightarrow 19 \text{ R}10$$

Check Your Understanding

Solve the following problems.

1. $380 \div 20$ **2.** $720 \div 40$ **3.** $663 / 51$

4. $972 \div 36$ **5.** $841 / 52$ **6.** $64\overline{)772}$

7. $895 \div 81$ **8.** $94\overline{)6{,}392}$

Write your answers on a separate sheet of paper.   **Student Practice**   **65**

Division