

Student Guide

Paper-and-Pencil Division (SG pp. 310–312)  
Questions 1–11

Methods will vary.

1. A.  $8563 \div 4 = 2140 \text{ R}3$   
 B.  $1256 \div 7 = 179 \text{ R}3$   
 C.  $547 \div 9 = 60 \text{ R}7$   
 D.  $3476 \div 4 = 869$
2. A.  $901 \div 8 = 112 \text{ R}5$ ;  $8 \times 112 = 896$  and  $896 + 5 = 901$   
 B.  $9017 \div 8 = 1127 \text{ R}1$ ;  $8 \times 1127 = 9016$  and  $9016 + 1 = 9017$
- 3.\* See the discussion in the lesson.
4. A.  $674 \div 5 = 134 \text{ R}4$   
 B.  $5667 \div 5 = 1133 \text{ R}2$   
 C.  $5274 \div 2 = 2637$   
 D.  $5277 \div 12 = 439 \text{ R}9$   
 E.  $8413 \div 7 = 1201 \text{ R}6$   
 F.  $792 \div 11 = 72$   
 G.  $3341 \div 4 = 835 \text{ R}1$   
 H.  $987 \div 8 = 123 \text{ R}3$
5.  $11 \times 72 = 792$ ;  $8 \times 123 = 984$  and  $984 + 3 = 987$
6. A. 10 snack bags  
 B. 10 or 100 snack bags  
 C. 120 is the number of snack bags sold if 12 customers bought 10 snack bags each.  
 D. 10 snack bags  
 E. 55 snack bags left  
 F. 4 snack bags  
 G. 24 snack bags  
 H. 7 snack bags left over
7. 4,172 snack bags;  $14,602 \div 3.50 = 4,172$
8. A. \$240;  $1200 \div 5 = 240$   
 B. \$30;  $240 \div 8 = 30$
9. 203 R2

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1. Solve these problems using the partial quotients method.

A.  $4 \overline{)8563}$                       B.  $7 \overline{)1256}$   
 C.  $547 \div 9$                       D.  $3476 \div 4$

2. Solve the following problems with the partial quotients method. Then check the answers with multiplication.

A.  $8 \overline{)901}$                       B.  $9017 \div 8$

3. Compare the following solutions to  $739 \div 5$ . Discuss how they are the same and how they are different. Discuss why some solutions use fewer steps.

$\begin{array}{r} 147 \text{ R}4 \\ 5 \overline{)739} \\ \underline{100} \\ 639 \\ \underline{40} \\ 200 \\ \underline{439} \\ 400 \\ \underline{39} \\ 35 \\ \underline{4} \\ 147 \end{array}$	$\begin{array}{r} 147 \text{ R}4 \\ 5 \overline{)739} \\ \underline{500} \\ 239 \\ \underline{40} \\ 200 \\ \underline{39} \\ 7 \\ \underline{35} \\ 4 \\ 147 \end{array}$	$\begin{array}{r} 147 \text{ R}4 \\ 5 \overline{)739} \\ \underline{625} \\ 114 \\ \underline{100} \\ 14 \\ \underline{10} \\ 4 \\ 147 \end{array}$	$\begin{array}{r} 147 \text{ R}4 \\ 5 \overline{)739} \\ \underline{700} \\ 39 \\ \underline{35} \\ 4 \\ 147 \end{array}$
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4. Solve the following problems using the partial quotients method. Think about what you observed in Question 3 to help keep the number of steps small. Check to be sure your answers are reasonable.

A.  $674 \div 5$                       B.  $5667 \div 5$   
 C.  $5274 \div 2$                       D.  $12 \overline{)5277}$   
 E.  $7 \overline{)8413}$                       F.  $792 \div 11$   
 G.  $4 \overline{)3341}$                       H.  $987 \div 8$

5. Show how to use multiplication to check your answers to Questions 4F and 4H.

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**✓ Check-In: Questions 6-10**  
 Refer to the *Multiplication and Division Facts* page and the *Division Strategies Menu* in the Student Guide Reference section.

6. Ana and Linda have 295 Crunchy Nut bags to sell. They are going to ask 12 of their neighbors and relatives to buy some. If each customer bought the same amount, how many snack bags would each person buy? Will any snack bags be left over? Help Ana and Linda think through their solution.

$\begin{array}{r} 12 \overline{)295} \\ \underline{120} \\ 175 \\ \underline{120} \\ 55 \\ \underline{48} \\ 7 \end{array}$	<p>10</p> <p>10</p> <p>4</p> <p>24</p>
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A. First try: \_\_\_\_\_ snack bags  
 B. You have used  $10 \times$  \_\_\_\_\_ or \_\_\_\_\_ snack bags.  
 C. What does the 120 mean?  
 D. Second try: \_\_\_\_\_ snack bags  
 E. What does the 55 mean?  
 F. Next try: \_\_\_\_\_ snack bags  
 G. How many snack bags would each person buy?  
 H. How many snack bags are left over?

7. The debate team raised \$14,602. How many Crunchy Nut snack bags did the debate team sell if each snack bag cost \$3.50?

8. The debate team budgeted \$1200 for meals for the five-day trip to Washington, D.C.

A. How much will the team spend each day on food?  
 B. If all eight members get the same food allowance, how much will each person get?

9.  $2235 \div 11$

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

## Answer Key • Lesson 3: Paper-and-Pencil Division

10. Keenya practiced several four-minute speeches in preparation for the debates. She presented these speeches a total of 1800 minutes throughout the semester. How many speeches did she give?

11. Jacob and Michael each solved the problem in Question 10.

Jacob's way:

$$\begin{array}{r} 450 \\ 4 \overline{)1800} \\ \underline{800} \\ 1000 \\ \underline{800} \\ 200 \\ \underline{200} \\ 0 \end{array} \quad \begin{array}{l} 200 \\ 200 \\ 50 \\ 450 \end{array}$$

Michael's way:

$$\begin{array}{r} 450 \\ 4 \overline{)1800} \\ \underline{1600} \\ 200 \\ \underline{160} \\ 40 \\ \underline{40} \\ 0 \end{array} \quad \begin{array}{l} 400 \\ 40 \\ 10 \\ 450 \end{array}$$

- How are Jacob and Michael's solutions alike? How are they different?
- What is Jacob's first partial quotient?
- What is Michael's first partial quotient?
- Which partial quotient would you start with? Why?
- Who used fewer steps? How did he do that?
- Can you solve this problem using fewer steps? If so, how?

Play the *Division Digits Game* in the *Student Activity Book* with a classmate.



Use the *Multiplication and Division Facts* page and the *Division Strategies Menu* in the *Student Guide Reference* section.

- The candy-wrapping machine at TIMS Candy Company grabs 6 Chocos at a time and wraps them in 1 second.
  - About how many times must the candy-wrapping machine run in order to wrap 5000 Chocos?
  - Will it take more or less than 30 minutes to wrap all of these candies? How did you decide?

- 450 speeches
- Jacob and Michael both used the partial quotients method, but they used different initial partial quotients
  - 200
  - 400
  - Answers will vary. Students may say they would start with 400, because  $400 \times 4$  is closer to 1800.
  - They each used three steps.
  - Answers will vary. Students may say two steps using 400 and then 50.

### Homework (SG pp. 312–314) Questions 1–22

- About 800 times
  - Less than 30 minutes. Possible response: 600 seconds is 10 minutes so 800 seconds is more but not double the amount of time, so it has to be less than 30 minutes.

2. About 6250 of each type; Possible response:  
 $4 \times 6000 = 24,000$  and  $4 \times 250$  is 1000.  
 $24,000 + 1000 = 25,000$ .
3. 56 cartons; Possible response: I divided 555 by 10 using the partial quotients method and got 55 with a remainder of 5. Since Mr. Haddad must put all the boxes in a carton he needs 56 cartons even though one of them is not full.
4. 50 R5
5. 51
6. 120 R6
7. 171 R2
8. 261
9. 150 R9
10. **A.** Responses will vary.  
 For Q# 9,  $150 \times 15 + 9 = 2259$
- B.** Responses will vary. One possible strategy for Q# 5 follows: 561 is close to 550.  
 $11 \times 50 = 550$ . Add one more 11 to make 561.  $50 + 1 = 51$ .
- C.** Stories will vary. One possible story for Q# 7 follows: There are 1078 dogs at the Spooky Pooch Parade and 6 competition categories. There are about the same number of dogs in each category. How many dogs are in each category? Two categories will have one more dog than the others.
11. Estimates will vary. Less than 100 or about 81 days. Possible response:  
 $660 + 640 = 1300$  ounces. If 8 ounces are in a cup and Shannon gives Sparky 2 cups a day that would be 16 ounces a day.  $16 \times 100$  days would be 1600 ounces, which is close to but 300 ounces more than 1300 ounces.  
 $16 \times 20 = 320$  ounces. So I subtracted 20 days from 100 for about 80 days. So she can feed Sparky for a little more than 80 days with the food she has.
12. **A.** 45 minutes per day  
**B.** 15 minutes per walk
13. Estimates will vary.  
 Between 800 and 1000 minutes.
14.  $4122 \div 8 = 515$  R2
15. 203 songs in each category
16. 90;  $450 \text{ minutes} \div 5 \text{ subjects} = 90 \text{ minutes}$

2. The TIMS Candy Company has 4 different kinds of Chocos: mint, peanut butter, crispy and plain. They make about 25,000 Chocos a day. If they make the same number of each type, about how many Chocos of each kind do they make? Show or tell how you know.

3. Ten individual boxes of Chocos fit inside a carton. Mr. Haddad is packing a school order for 555 individual boxes. How many cartons does he need? Show or tell how you know.

**Compute using the partial quotients method. Remember to check whether your answer seems reasonable.**

4.  $14 \overline{)705}$       5.  $11 \overline{)561}$       6.  $1446 \div 12$

7.  $1028 \div 6$       8.  $9 \overline{)2349}$       9.  $2259 \div 15$

10. **A.** Pick one of Questions 4–9 and check the answer using multiplication.  
**B.** Pick one of Questions 4–9 and use estimation to show that your answer is reasonable.  
**C.** Pick one of Questions 4–9 and write a story problem to match.

11. Every day Shannon feeds her dog Sparky a mixture of dry and wet dog food. She has 660 ounces of wet food and 640 ounces of dry food. If Shannon feeds Sparky two cups of food each day, how many days can she feed Sparky? Show or tell how you know.

12. Shannon walks Sparky 315 minutes a week. She takes him outside three times a day: once in the morning, once after school, and once after dinner.


**A.** How many minutes does she walk Sparky per day?  
**B.** How long is each walk, if each walk is the same length of time?

13. Shannon trained Sparky to sit, lie down, and roll over. It took him about 2900 minutes to learn all three tricks. About how much time does it take Sparky to learn one trick?

14.  $4122 \div 8$

15. Luis has 2233 songs on his digital player and he sorted them into 11 categories. If each category has the same number, how many songs are in each category?

16. Luis has homework in English, math and music every day and science and history twice a week. He spends 450 minutes a week on homework. If he spends the same amount of time on each subject, how many minutes does he spend on each subject every week?



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## Answer Key • Lesson 3: Paper-and-Pencil Division

17. Luis spends about 450 minutes on chores and 450 minutes on homework during the five-day school week.
- A. How many minutes per school week does Luis spend on chores and homework?
  - B. How many minutes per day does Luis spend during the school week on chores and homework?
  - C. How many hours per day does Luis spend on chores and homework?
18.  $4 \overline{)2601}$
19. Ana's violin teacher told her if she practiced 10,000 hours she would be an expert violinist.
- A. If Ana practices 30 hours every month, about how many months will it take her to be an expert?
  - B. About how many years?
  - C. About how many hours a month would Ana have to practice to be an expert in ten years?
  - D. About how many hours a day would she have to practice?
20. Ana wants to earn money to go to summer music camp. Three weeks cost \$1710. About how much money will Ana need to earn for one week of music camp?
21. Ana and Maya earned \$660 dollars helping Mrs. Garcia with her housework on the weekend. She paid them each \$15 a week. How many weeks did they work for Mrs. Garcia?
22.  $6 \overline{)2072}$

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17. A. 900 minutes  
B. 180 minutes  
C. 3 hours
18.  $2061 \div 4 = 650 \text{ R}1$
19. A. About 333 months  
B. About 28 years  
C. About 90 hours  
D. About 3 hours a day
20. One week of music camp costs \$570.
21. 22 weeks; Possible response:  $\$15 \times 2 = 30$ .  
 $660 \div 30 = 22$
22.  $2072 \div 6 = 345 \text{ R}2$



# Answer Key • Lesson 3: Paper-and-Pencil Division

Name \_\_\_\_\_ Date \_\_\_\_\_

6. A. Frank solved 7209 divided by 11 using the column method, which he called the "fair shares" method. Show how his solution would look if he had used the partial quotients method. Use the same estimates that Frank used.

**Frank's work**

5	5	5	5	5	5	5	5	5	5	5	5
50	50	50	50	50	50	50	50	50	50	50	50
300	300	300	300	300	300	300	300	300	300	300	300
200	200	200	200	200	200	200	200	200	200	200	200
100	100	100	100	100	100	100	100	100	100	100	100
1	2	3	4	5	6	7	8	9	10	11	

$$100 + 200 + 300 + 50 + 5 = 655 \text{ R}4$$

Into Columns	Left to Divide	Partial Quotients Method
$11 \times 100 = 1100$	$7209 - 1100 = 6109$	$\square$
$11 \times 200 = 2200$	$6109 - 2200 = 3909$	$11 \overline{) 7209} \quad 100$
$11 \times 300 = 3300$	$3909 - 3300 = 609$	$\quad 1100$
$11 \times 50 = 550$	$609 - 550 = 449$	$\quad 6109$
$11 \times 5 = 55$	$59 - 55 = 4$	$\quad \underline{2200}$
		$\quad \underline{3300}$
		$\quad \underline{550}$
		$\quad \underline{59}$
		$\quad \underline{4}$

- B. Show how Frank could have solved the problem using fewer steps. Hint: Think about the division facts.

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Assessment Master

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6. A.

$$\begin{array}{r}
 \boxed{655 \text{ R}4} \\
 11 \overline{) 7209} \quad 100 \\
 \underline{6100} \\
 1100 \\
 \underline{2200} \\
 3909 \\
 \underline{3300} \\
 609 \\
 \underline{550} \\
 59 \\
 \underline{55} \\
 4 \\
 \boxed{5} \\
 \boxed{655}
 \end{array}$$

B.

$$\begin{array}{r}
 \boxed{655 \text{ R}4} \\
 11 \overline{) 7209} \quad 600 \\
 \underline{6600} \\
 609 \\
 \underline{550} \\
 59 \\
 \underline{55} \\
 4
 \end{array}$$

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Name \_\_\_\_\_ Date \_\_\_\_\_

**Paper-and-Pencil Division Quiz Feedback Box**

Expec- tation	Check In	Comments
Divide multi-digit numbers by one- and two-digit divisors using paper and pencil. [Q# 1-6]	E7	
• Check work using multiplication. • Check for reasonableness using mental math or estimation. [Q# 4]	E3	
Inequal remainders from division of multi-digit numbers. [Q# 2]	E6	
Divide numbers that are multiples of ten. [Q# 1]	E2	
Show connections between models and strategies for multi-digit division. [Q# 6]		
	Yes...	Yes, but...
	No, but...	No...

**MP3. Check for reasonableness.** I look back at my solution to see if my answer makes sense. If it does not, I try again. [Q# 2]

**MP4. Check my calculations.** I find mistakes. I correct them. [Q# 2]

**MP5. Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 2]

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