

Student Guide

Estimating Quotients

Questions 1–13 (SG pp. 541–542)

1. Strategies will vary. $206 \div 5 = 41$ R1. Possible estimate: $206 \div 5$ is a little more than 40. Each parent made about 40 popcorn balls. I know my answer is reasonable because $5 \times 40 = 200$.
2. They put 20 balloons on each table with 3 left over. I used the column method. I checked my answer by using multiplication facts. $183 \div 9$ is more than 20 because $9 \times 20 = 180$. So each table will have a little more than 20 balloons, which is close to my answer.
3. $200 \div 9 = 22$ with 2 band members left over. $200 \div 9$ is a little more than 20 because $9 \times 20 = 180$; so 9 times a little more than 20 is 200.
4. $\$2200 \div 7 = 314$ R2. I know my answer is reasonable because $2100 \div 7 = 300$, which is close. So $2200 \div 7$ is going to be a little more than 300. There are about 300 band members in each row.
5. $71 \text{ students} \div 6 \text{ people per car} = 11$ R5. They will need 12 cars so all can ride. I know my answer is reasonable because I thought of $6 \times 10 = 60$, $6 \times 11 = 66$, $6 \times 12 = 72$. 66 students will fill 11 cars and the remaining 5 students will go in the twelfth car.
- 6.* Possible response: $468 \div 7$ is between 60 and 70. So each girl will have between \$60 and \$70 for camp. $7 \times 60 = 420$ and $7 \times 70 = 490$.

Estimating Quotients

Solve the following problems. Show how you checked to see if your answer is reasonable.

1. Five parents made 206 popcorn balls to sell at the school fair. Each parent made about the same number. How many popcorn balls did each parent make?
2. The boys and girls decorated the tables with balloons. They used 183 balloons for 9 tables. They wanted to put the same number on each table. How many balloons did they put on each table?
3. A marching band has 200 members. The band members march in rows of nine. Estimate about how many rows of band member there are.
4. A basketball league raised about \$2200 for uniforms. If the money is shared equally among the seven teams in the league, estimate about how much money each team can spend on uniforms.
5. 71 students from Bessie Coleman School are going to go on the giant ferris wheel ride. Each car holds six people. How many cars will the students need so that they all can ride?
6. Seven girls have been selling cookies to raise money to go to camp. They will split the money they raise equally. Together they have raised \$468. About how much money will each girl get?

Use the *Using Multiplication Facts to Estimate* pages in your *Student Activity Book* to practice estimating quotients.

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Estimation Problems

Write a division number sentence for each question below. Then estimate answers to the problems. Show how you made your estimates. Do not find an exact answer.

7. There are 165 students enrolled in the fourth grade at Wentworth School. If there are six fourth-grade classrooms, about how many students are in each class? Write your answer as a range between two numbers of students.
8. Jacob listed the following quotients to help him solve $496 \div 8$.

$$\begin{array}{l} 8 \times 40 = 320 \\ 8 \times 50 = 400 \\ 8 \times 60 = 480 \\ 8 \times 70 = 560 \end{array}$$

Write an estimate using his list of quotients.

9. A typical baby male gorilla weighs about 3 pounds at birth. A typical adult male gorilla can weigh about 475 pounds. About how many times heavier is an adult male gorilla than a baby male gorilla?
10. About eight times as many students from Bessie Coleman School attended the basketball game than students from James Madison School. Maya counted about 260 students at the game from Bessie Coleman. About how many students were from James Madison School?
11. Jackie baked 485 cookies for the bake sale. She wants to sell them in bags of six. She has 75 bags. Does she have enough bags?

✓ **Check-In: Questions 12-13**

12. Nila has a jar with about 600 jelly beans in it. She wants to divide the jelly beans into nine shares to give out to her friends. About how many jelly beans should be in each share?
13. Ming has 425 stickers to share equally among his seven friends. About how many stickers should he give each friend?

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Questions 7–13

Estimates and strategies will vary. One possible strategy is given for each.

- 7.* $165 \div 6$. Possible estimate: Between 20 and 30 students; $6 \times 20 = 120$ and $6 \times 30 = 180$, so $165 \div 6$ is between 20 and 30 students.
- 8.* $496 \div 8$ is between 60 and 70; $8 \times 60 = 480$ and $8 \times 70 = 560$.
- 9.* $475 \div 3$ is more than 100. $3 \times 100 = 300$ and $3 \times 50 = 150$, so $3 \times 150 = 450$. A better estimate would be about 150.
- 10.* $260 \div 8$. Possible estimate: Between 30 and 40 students; $8 \times 30 = 240$ and $8 \times 40 = 320$, so $260 \div 8$ is between 30 and 40.
- 11.* $485 \div 6$. Possible estimate: No, she does not have enough bags. She needs at least 80 bags, because $6 \times 80 = 480$, which is fewer than the 485 cookies she has.
- 12.* $600 \div 9$. Possible estimate: Between 60 and 70 jelly beans; $9 \times 60 = 540$ and $9 \times 70 = 630$, so $600 \div 9$ is between 60 and 70.
- 13.* $425 \div 7$ is between 60 and 70; $7 \times 60 = 420$ and $7 \times 70 = 490$.

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

Homework (SG p. 543)

Questions 1–9

1. A. 4; 40; 400; 4000 B. 2; 20; 200; 2000
 C. 3; 30; 300; 3000 D. 8; 80; 800; 8000
2. A. 1; 1; 10; 100; 1000 B. 4; 4; 40; 400; 400
 C. 7; 7; 70; 700; 70 D. 6; 6; 60; 600; 60
3. Strategies will vary. Possible response: I know $28 \div 7 = 4$. I used that fact to answer the others. Each time I thought of a multiplication problem like $70 \times ? = 280$.
 I know $4 \times 7 = 28$ so $4 \times 70 = 280$.

Possible responses and estimation strategies given for Questions 4–9:

4. $288 \div 3$ is a little less than 100 because $300 \div 3 = 100$. $3 \times 100 = 300$ and $3 \times 90 = 270$. I used 3×10 and 3×9 .
5. $346 \div 7$ is a little less than 50. $7 \times 50 = 350$ and $7 \times 40 = 280$. I used 7×5 and 7×4 .
6. $452 \div 9$ is about 50. $9 \times 50 = 450$ and $9 \times 60 = 540$. 452 is close to 450. I used 9×5 and 9×6 .
7. $590 \div 8$. Possible estimate: A little more than 70 boxes but fewer than 80 boxes.
 $8 \times 70 = 560$, $8 \times 80 = 640$.
8. $950 \div 8$ is more than 100. $8 \times 100 = 800$ and $8 \times 200 = 1600$. 950 is closer to 800 than it is to 1600, so the answer is probably closer to 100 than to 200.
9. A. $4142.65 - 500 = 3642.65$.
 $\$3600 \div 6 = \text{about } \600 for each boy.
 B. An additional \$150 per boy needs to be raised, so the boys need to raise about \$900 more.

Solve these division problems mentally. Check your answers using a calculator.

1. A. $8 \div 2$ $80 \div 2$ $800 \div 2$ $8000 \div 2$	B. $20 \div 10$ $200 \div 10$ $2000 \div 10$ $20,000 \div 10$	C. $27 \div 9$ $270 \div 9$ $2700 \div 9$ $27,000 \div 9$	D. $48 \div 6$ $480 \div 6$ $4800 \div 6$ $48,000 \div 6$
2. A. $5 \div 5$ $50 \div 50$ $500 \div 50$ $5000 \div 50$ $50,000 \div 50$	B. $28 \div 7$ $280 \div 70$ $2800 \div 70$ $28,000 \div 70$ $280,000 \div 700$	C. $42 \div 6$ $420 \div 60$ $4200 \div 60$ $42,000 \div 60$ $420,000 \div 6000$	D. $30 \div 5$ $300 \div 50$ $3000 \div 50$ $30,000 \div 500$ $300,000 \div 5000$

3. Show or tell how you solved the problems in Question 2B. If you used a rule, describe how the rule works.

Estimate each quotient. Show which multiplication facts you used to make your estimate.

4. $3 \overline{)288}$	5. $346 \div 7$	6. $9 \overline{)452}$
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7. Workers can fit eight math books into a box. About how many boxes will be needed to pack 590 books?

8. There are eight pear trees in an orchard. This year, about 950 pears were picked from the trees. If about the same number of pears were picked from each tree, about how many pears were picked from each tree?

9. Six boys have been selling candy to raise money to go to baseball camp. They will split all the money they raise equally. They have raised \$4142.65, but they have to pay back about \$500 for the candy before dividing the money.

A. Show how you estimate about how much money each boy will get for baseball camp.

B. If the camp costs \$750 for each boy, about how much more money do the six boys have to raise altogether?

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Name _____ Date _____

Using Multiplication Facts to Estimate

Estimate each quotient. Show which multiplication facts you used to make your estimates.

Example: $7 \overline{)468}$

Think:

$7 \times 50 =$	350
$7 \times 60 =$	420
$7 \times 70 =$	490

← 468

Answer: The quotient will be at least 60 but less than 70. I used multiples of 10 and 7×5 , 7×6 , and 7×7 . Since 468 is between $7 \times 60 = 420$ and $7 \times 70 = 490$.

1. Kenya listed the following quotients to help her solve $384 \div 5$.

$5 \times 50 =$	250
$5 \times 60 =$	300
$5 \times 70 =$	350
$5 \times 80 =$	400

Write an estimate using her list of multiplication facts.

2. $256 \div 4$

3. $416 \div 5$

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Name _____ Date _____

4. $3 \overline{)225}$

5. $728 \div 8$

6. $8 \overline{)536}$

7. $9 \overline{)235}$

8. $290 \div 7$

9. $6 \overline{)342}$

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

Student Activity Book

Using Multiplication Facts to Estimate

Questions 1–9 (SAB pp. 511–512)

Estimates and strategies will vary. One possible strategy is given for each.

1. $384 \div 5$ is between 70 and 80 because $5 \times 70 = 350$ and $5 \times 80 = 400$.
- 2.* 4×6 and 4×7 . Less than 70; $280 \div 4 = 70$, so $256 \div 4$ is less than 70, but more than 60.
3. 5×8 and 5×9 . A little more than 80; $5 \times 80 = 400$ and $5 \times 90 = 450$, so $416 \div 5$ is between 80 and 90, but it is closer to 80 because 416 is closer to 400 than it is to 450.
4. 3×7 and 3×8 . Between 70 and 80; $3 \times 70 = 210$ and $3 \times 80 = 240$, so $225 \div 3$ is between 70 and 80.
5. 8×9 . 91; $720 \div 8 = 90$, so $728 \div 8$ is one more, 91.
6. 8×6 and 8×7 . Between 60 and 70; $8 \times 60 = 480$ and $8 \times 70 = 560$, so $536 \div 8$ is between 60 and 70.
7. 9×2 and 9×3 . Between 20 and 30; $9 \times 20 = 180$ and $9 \times 30 = 270$, so $235 \div 9$ is between 20 and 30.
8. 7×4 and 7×5 . A little more than 40; $7 \times 40 = 280$ and $7 \times 50 = 350$, so $290 \div 7$ is between 70 and 80 but it will be closer to 70 because 290 is closer to 280 than it is to 350.
9. 6×5 and 6×6 . Between 50 and 60; $6 \times 50 = 300$ and $6 \times 60 = 360$, so $342 \div 6$ is between 50 and 60.